USER'S GUIDE

masterswitch plus

Contents

Introduction

Product Description

Features of MasterSwitch Plus

MasterSwitch Plus allows you to individually control power to connected equipment and to gracefully shut down or restart up to eight connected servers running different operating systems. In order to manage your system effectively and efficiently, MasterSwitch Plus has these additional features:

- Three password-protected accounts that ensure restricted access to system-, device-, and outlet-level services.
- Automatic shut-down of connected servers attached to an APC UPS when the UPS enters an on-battery state and removes power from connected equipment after the server confirms shutdown.
- Shuts down servers before cycling power to the connected equipment (Graceful Reboot).
- Control of eight power outlets (per unit) for complete and flexible management of connected equipment.
- Web, Control Console, or SNMP management interfaces.
- Configure the sequence in which outlets receive power upon start-up.
- Connects serially to up to three expansion units (AP9225EXP), providing control of 32 connected devices with one IP address.
- Basic and MD5 authentication for password security.
- Event Log accessible by FTP, Telnet, serial connection, or a Web browser.

The MasterSwitch Plus does not provide power protection. Therefore, APC does not recommend plugging a unit directly into any unprotected power source, such as a wall outlet.

Initial setup

You must define three TCP/IP settings for the MasterSwitch Plus before it can operate on the network.

- IP address of the unit
- Subnet mask
- IP address of the default gateway

To configure the TCP/IP settings, see the MasterSwitch Plus *Installation and Quick Start Manual* (**.\MS_PLUS\insguide.pdf**), provided in PDF on the APC MasterSwitch *Utility* CD and in printed form.

Access Procedures

Overview

The MasterSwitch Plus has two internal interfaces (control console and Web interface) that provide menus with options that allow you to manage the unit. The SNMP interface also allows you to use an SNMP browser with the PowerNet® Management Information Base (MIB) to manage the unit.

For more information about the internal user interfaces, see Control Console and Web Interface.

To use the PowerNet MIB with an SNMP browser, see the *PowerNet® SNMP Management Information Base (MIB) Reference Guide* (**.\MS_PLUS\mibguide.pdf**),which is provided on the APC MasterSwitch *Utility* CD.

Access priority for logging on

Only one user at a time can log on to the unit to use its internal user interface features. The priority for access is as follows:

- Local access to the control console from a computer with a direct serial connection to the unit always has the highest priority.
- Telnet access to the control console from a remote computer has priority over Web access.
- Web access has the lowest priority.

Types of user accounts

The MasterSwitch Plus has three levels of access (Administrator, Device Manager, and Outlet User), all of which are protected by password and user name requirements.

- An Administrator can use all of the management menus available in the control console and the Web interface. The Administrator's default user name and password are both **apc**.
- A Device Manager can use only the following menus (the default user name is **device** and the password is **apc**):
  - the Device Manager menu and its sub-menus in the control console, and all menus in the top section of the navigation panel of the Web Interface (**MasterSwitch Plus** and **Outlets**)
  - the Log option in the **Events** menu in the Web interface (A Device Manager can also access the event log in the control console by pressing `Ctrl-L`.)
- An Outlet User can access only the following menus:
  - the **Control** option of the **Outlets** menu on the web interface
  - the Device Manager menu and the **Outlet Control** sub-menus in the control console

To set the Administrator, Device Manager, or Outlet User user name and password settings, see User Manager or Outlet Manager.

How to Recover From a Lost Password

You can use a local computer that connects to the unit through the serial port on the front panel of the unit.

1. Select a serial port at the local computer, and disable any service which uses that port.
2. Use the supplied smart-signaling cable (940-0024C) to connect the selected port to the serial port on the front panel of the unit.
3. Run a terminal program (such as HyperTerminal) and configure the selected port for 2400 bps, 8 data bits, no parity, 1 stop bit, and no flow control. Save the changes.
4. Press ENTER twice to display the **User Name** prompt.
5. Press the Reset button on the Network Management Card, which causes the it to restart, a process that takes approximately 15 seconds.
6. Press ENTER as many times as necessary to redisplay the **User Name** prompt, then use **apc** for the user name and password. (If you take longer than 30 seconds to log on after the **User Name** prompt is redisplayed, you must start the login procedure again at step 4.)
7. From the **Control Console** menu, select **System**, then **User Manager**.
8. Select **Administrator**, and change the **User Name** and **Password** settings, both of which are now defined as **apc**.
9. Press CTRL-C and log off.

Reconnect any cable that you disconnected in **step 2** and restart any service that you disabled in **step 1**.

Upgrading Firmware

See also

For a complete description of how to download a firmware upgrade for your MasterSwitch Plus, see the *Management Card Addendum* (**.\MS_PLUS\Addendum.pdf**) on the provided APC MasterSwitch *Utility* CD.

You can use a local computer that connects to the unit through the serial port on the front panel of the unit.

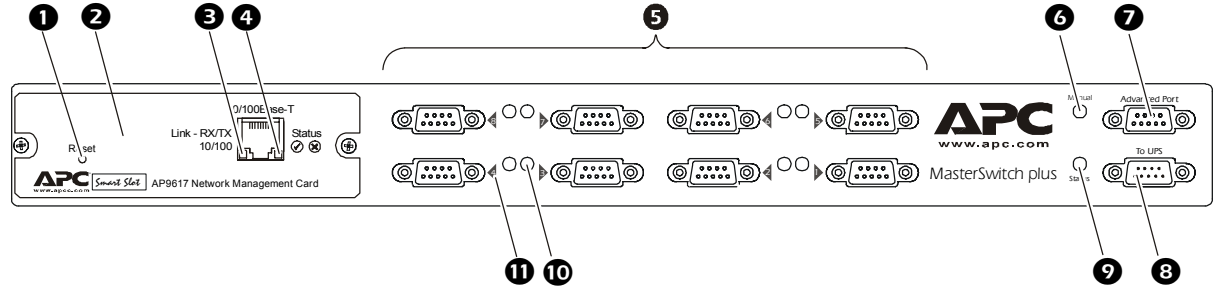
1. Select a serial port at the local computer, and disable any service which uses that port.
2. Use the supplied smart-signaling cable (940-0024C) to connect the selected port to the serial port on the front panel of the unit.
3. Run a terminal program (such as HyperTerminal) and configure the selected port for 2400 bps, 8 data bits, no parity, 1 stop bit, and no flow control. Save the changes.
4. Press ENTER twice to display the **User Name** prompt.
5. Enter your user name and password (both **apc**, for administrators only) and press the Enter key.
6. From the **Control Console** menu, select **System**, then **Tools**, then **XMODEM**.
7. At the prompt `Perform transfer with XMODEM-CRC?` type `yes`, and press ENTER.
8. The system will then prompt you to choose a transfer rate and to change your terminal settings to match the transfer rate. Press ENTER to set the MasterSwitch Plus to accept the download.
9. In the terminal program, send the file using the XMODEM protocol. Upon completion of the transfer, the console will prompt you to restore the baud rate to normal.

Do not interrupt the download.

The MasterSwitch Plus will restart when the download is complete.

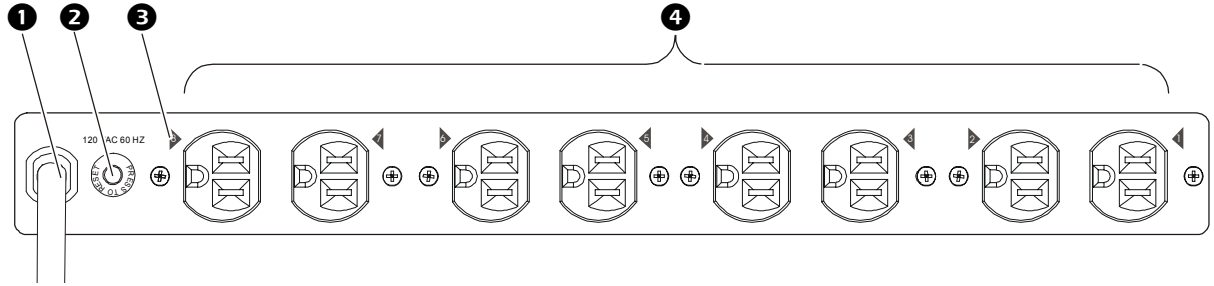
Upgrading the firmware will not interfere with the operation of the outlets.

Front Panel



	Item	Function
❶	Reset Button	Resets the MasterSwitch Plus without affecting the outlet status.
❷	Network Management Card	Allows you to use a Web browser, Telnet, or a serial interface to remotely manage the MasterSwitch Plus and connected devices (AP9225 only).
❸	Status LED	See Status LED.
❹	Link RX/TX LED	See Link-RX/TX (10/100) LED.
❺	Basic Ports	Connects the MasterSwitch Plus to servers running PowerChute or built-in UPS monitoring software.
❻	Manual Button	Issues a Battery Capacity Override command or cancels a Master Power On Delay, depending on the situation. See Manual button for details.
❼	Advanced Port	Allows the connected server to communicate with a UPS operating in Smart Mode and can also be used as a management port.
❽	To UPS Port	Connects the MasterSwitch Plus to a UPS or another unit with the supplied cable (APC part number 940-1000).
❾	MasterSwitch Plus Status	See MasterSwitch Plus Status LED.
❿	Basic port LED	See Basic Port LED
⓫	Port Label	Corresponds to the outlet number on the rear panel.

Rear Panel



	Item	Function
1	Power Cord	Provides input power to the MasterSwitch Plus (120 VAC 60 HZ).
2	Circuit Breaker	Press the button to reset the circuit breaker.
3	Outlet Label	Relates each outlet to its corresponding basic port.
4	Outlets	Eight controllable outlets that provide power to connected equipment.

Link-RX/TX (10/100) LED

This LED indicates the network status.

Condition	Description
Off	One or more of the following situations exist: • The Management Card is not receiving input power. • The cable that connects the Management Card to the network is disconnected or defective. • The device that connects the Management Card to the network is turned off or not operating correctly. • The Management Card itself is not operating properly. It may need to be repaired or replaced. Contact APC Worldwide Customer Support.
Solid Green	The MasterSwitch Plus is connected to a network operating at 10 Megabits per second (Mbps).
Solid Orange	The MasterSwitch Plus is connected to a network operating at 100 Megabits per second (Mbps).
Flashing Green	The MasterSwitch Plus is receiving or transmitting data packets from the network at 10 Megabits per second (Mbps).
Flashing Orange	The MasterSwitch Plus is receiving or transmitting data packets from the network at 100 Megabits per second (Mbps).

Status LED

This LED indicates the network status of the MasterSwitch Plus.

Condition	Description
Off	The MasterSwitch Plus has no power.
Solid Green	The MasterSwitch Plus has valid TCP/IP settings.
Flashing Green	The MasterSwitch Plus does not have valid TCP/IP settings.[1]
Solid Orange	A hardware failure has been detected in the MasterSwitch Plus. Contact APC Worldwide Customer Support.
Flashing Orange	The MasterSwitch Plus is making BOOTP[2] requests.

1 If you do not use a BOOTP server, see the MasterSwitch Plus *Installation and Quick Start Manual (.\MSPLUS\insguide.pdf)* provided in PDF on the APC MasterSwitch *Utility* CD and in printed format to configure the TCP/IP settings.
2 To use a BOOTP server, see the *Management Card Addendum* (.\doc\Addendum.pdf) on the APC MasterSwitch *Utility* CD.

Basic Port LED

LED State	Definition
On	The outlet is on.
Off	The outlet is off.
Mostly off[1]	The outlet is off with a pending action to turn on.
Mostly on[2]	The outlet is on with a pending action to turn off.
Flashing green	The outlet cannot turn on due to an Environmental alarm.

1 The LED flashes on and off, with the off state lasting longer.

2 The LED flashes off and on, with the on state lasting longer.

MasterSwitch Plus Status LED

LED State	Definition
Off	MasterSwitch Plus has no power.
Solid green	MasterSwitch Plus has valid network settings.
Flashing green	MasterSwitch Plus does not have valid network settings. See the Installation Manual for more information.
Flashing red slowly	MasterSwitch Plus is making a BOOTP request.
Solid red	MasterSwitch Plus has detected a hardware failure.

Manual button

The Manual button is used to cancel two different commands. If this button is pressed for at least $^1/_2$ second and then released, one of the following results will occur:

- If the MasterSwitch Plus is waiting for the Master Power On Delay to expire, MasterSwitch Plus will issue a cancel command. The diagram in Unit/Outlet start-up sequence illustrates the outlet's behavior when the Master Power On Delay is cancelled.
- If the configuration contains a UPS and the UPS is operating on AC power, then MasterSwitch Plus will issue a Battery Capacity Override command. The diagram in Unit/Outlet start-up sequence illustrates the outlet's behavior when the Battery Capacity Override command is issued.

If neither of the above conditions are true, pressing the Manual button will have no effect.

Watchdog Features

Overview

To detect internal problems and recover from unanticipated inputs, the unit uses internal, system-wide watchdog mechanisms. When it reboots itself to recover from an internal problem, a System: Warmstart event is recorded in the Event Log.

Network interface watchdog mechanism

The unit implements internal watchdog mechanisms to protect itself from becoming inaccessible over the network. For example, if the unit does not receive any network traffic for 9.5 minutes (either direct traffic, such as SNMP, or broadcast traffic, such as an Address Resolution Protocol [ARP] request), it assumes that there is a problem with its network interface and reboots itself.

Resetting the network timer

To ensure that the unit does not reboot if the network is quiet for 9.5 minutes, the unit attempts to contact the Default Gateway every 4.5 minutes. If the gateway is present, it responds to the unit, and that response restarts the 9.5-minute timer. If your application does not require or have a gateway, specify the IP address of a computer that is running on the network most of the time and is on the same subnet. The network traffic of that computer will restart the 9.5-minute timer frequently enough to prevent the unit from rebooting.

MasterSwitch Plus Properties

Outlet properties

Outlet properties are governed by two operating modes: Annunciator and Graceful Shutdown. Some outlet properties are common to both control modes, while other properties are specific to an operating mode.

Property	Control Mode	Default Setting for outlet modes							
		1	2	3	4	5	6	7	8
Outlet Control Mode	N/A	Graceful Shutdown Mode							
Name: Outlet #___	Both	1	2	3	4	5	6	7	8
Power On Time Delay (seconds)	Graceful Shutdown	0	2	4	6	8	10	12	14
Battery Capacity Threshold	Graceful Shutdown	0%							
Low Battery Warning Control (minutes)	Graceful Shutdown	4.5							
Power Off Time Delay (seconds)	Graceful Shutdown	120							
UPS Low Battery Multiplier	Graceful Shutdown	1							
Will Device Confirm	Graceful Shutdown	No							
Restart Delay	Graceful Shutdown	Remain Off							
Reboot Duration (seconds)	Graceful Shutdown	5							
Initial State (non-alarm)	Annunciator	Off							
Alarm Action Delay (seconds)	Both	15							
Environment Alarm Masks	Both	Disabled (for each Environment alarm)							

MasterSwitch Plus configuration

Configuration of MasterSwitch Plus is dependent upon your application. You can use only “on-demand” operations (On, Off, Shutdown, and Reboot), or you can couple on-demand operations with “unattended” shutdown features. If you plan to use only on-demand operations, see Configuring an outlet for on-demand operation. If you plan to use the “unattended” shutdown features of MasterSwitch Plus in addition to the on-demand operations, see Configuring an outlet for unattended shutdown.

MasterSwitch Plus behaviors

The diagrams, starting with Unit/Outlet start-up sequence, define the behaviors for every event recognized by the MasterSwitch Plus unit. You customize the unit‘s behavior by choosing specific values for the unit and outlet properties. All outlet and unit properties on the diagrams are a highlighted hotlink that lead you to the property’s definition. All outlet and unit properties are defined in MasterSwitch Plus Menus.

Configuring an outlet for on-demand operation

Configuring an outlet for on-demand operation requires selecting values for the following properties:

Property	Used in Sequence Diagram
Unit Properties	
Power On Time Delay	Unit/Outlet start-up sequence
Outlet Properties	
Outlet Control Mode	No diagram available
Reboot Duration	Reboot sequence and Graceful reboot sequence

Property	Used in Sequence Diagram
Device Confirm	Graceful shutdown sequence, Graceful shutdown sequence for On-battery events, Graceful shutdown sequence for environment alarms, and Graceful reboot sequence
Power Off Delay	Graceful shutdown sequence, Graceful shutdown sequence for On-battery events, Graceful shutdown sequence for environment alarms, and Graceful reboot sequence
Restart Delay	Graceful shutdown sequence
Power On Delay	Unit/Outlet start-up sequence, Graceful shutdown sequence, Graceful shutdown sequence for On-battery events, Graceful shutdown sequence for environment alarms, and Delayed On sequence

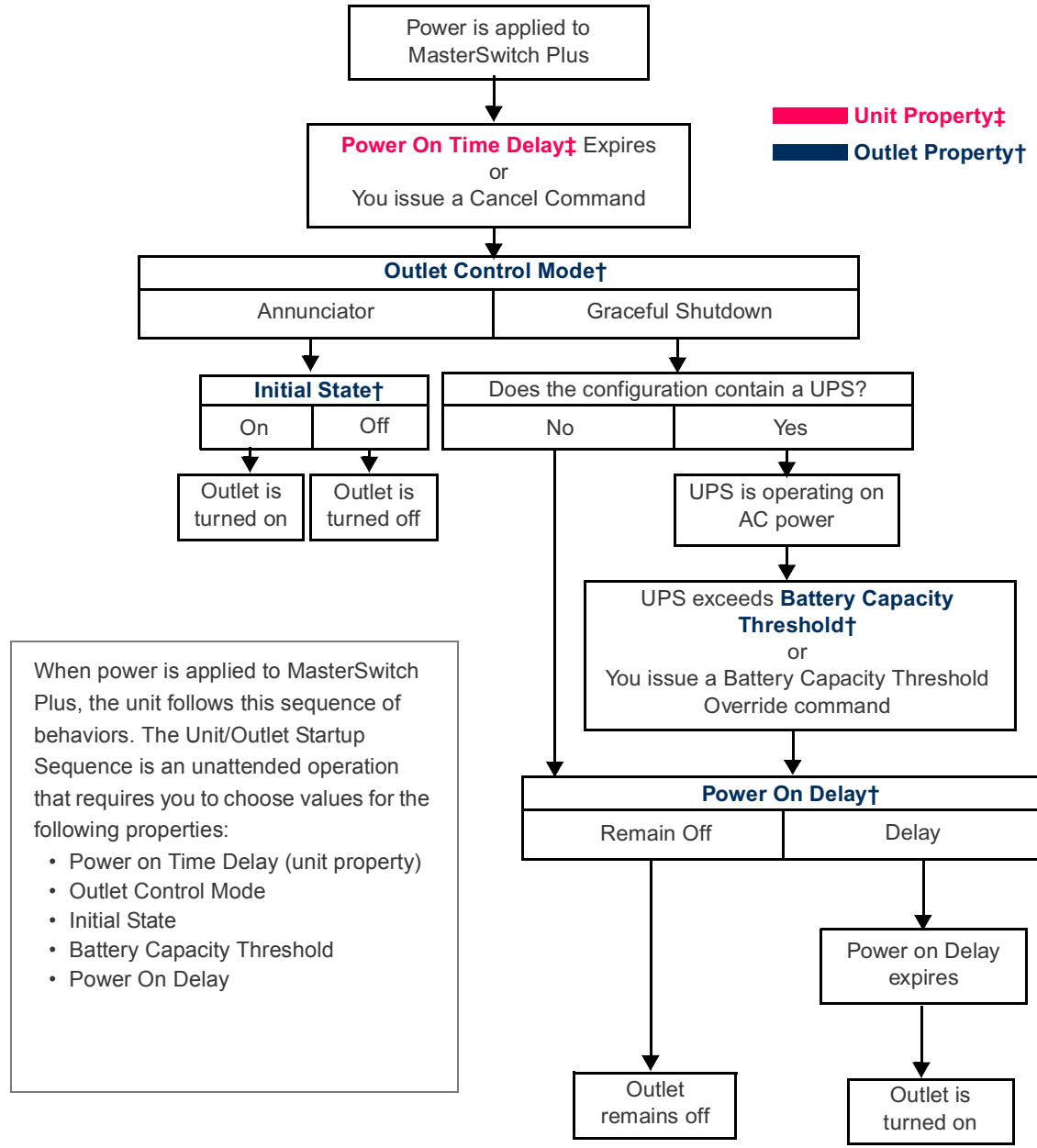
Configuring an outlet for unattended shutdown

Configuring an outlet for unattended shutdown requires selecting values for the following properties:

Property	Used in Sequence Diagram
Unit Properties	
Power On Time Delay	Unit/Outlet start-up sequence
Outlet Properties	
Graceful Shutdown	
UPS Low Battery Multiplier	Graceful shutdown sequence for On-battery events
Low Battery Warning Control	Graceful shutdown sequence for On-battery events
Device Confirm	Graceful shutdown sequence, Graceful shutdown sequence for On-battery events, Graceful shutdown sequence for environment alarms, and Graceful reboot sequence

Property	Used in Sequence Diagram
Power Off Delay	Graceful shutdown sequence for On-battery events, Graceful shutdown sequence for environment alarms, and Graceful reboot sequence
Annunciator	
Alarm Action Delay	Graceful shutdown sequence for environment alarms and Annunciator sequence for environment alarms

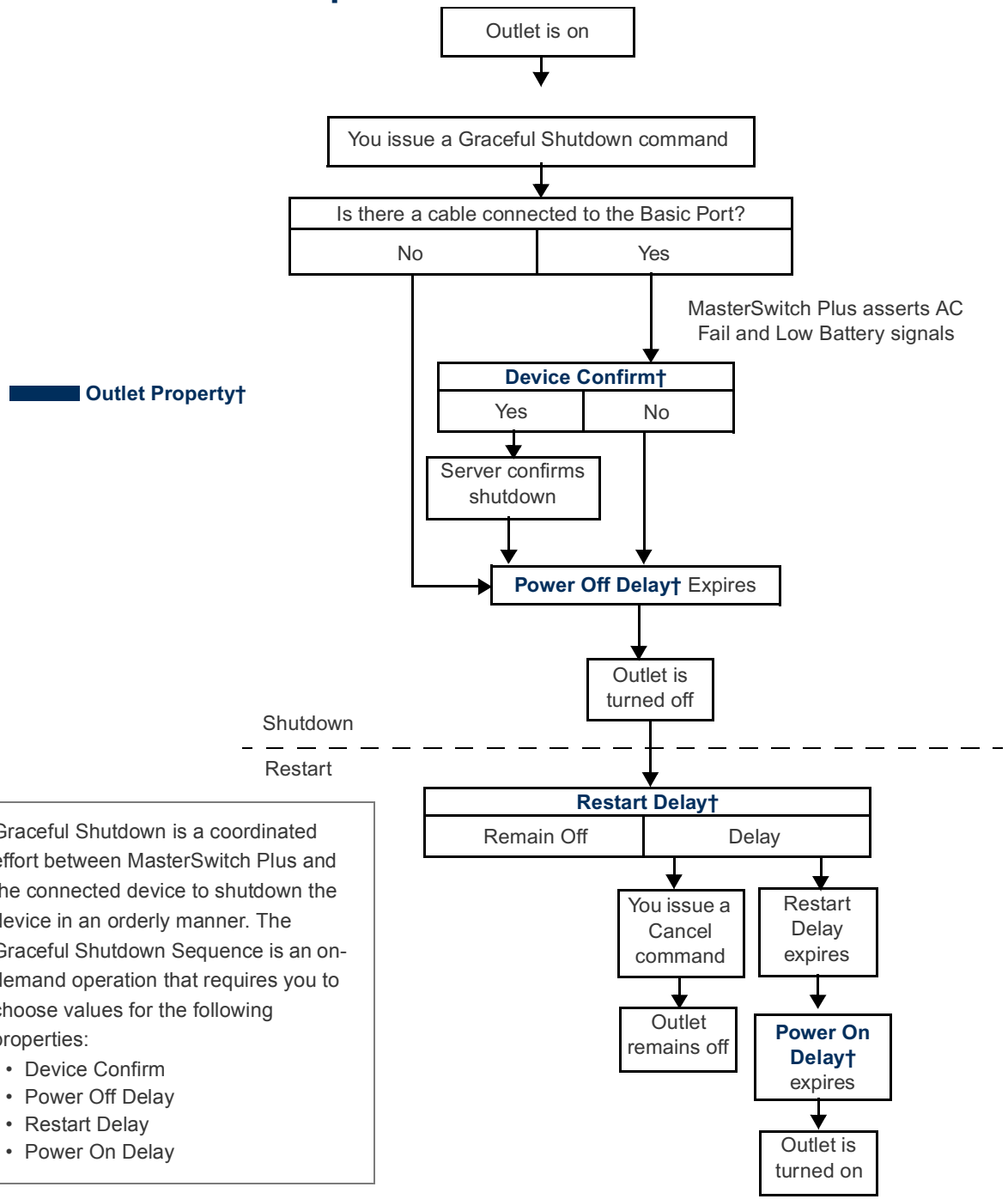
Unit/Outlet start-up sequence



When power is applied to MasterSwitch Plus, the unit follows this sequence of behaviors. The Unit/Outlet Startup Sequence is an unattended operation that requires you to choose values for the following properties:

- Power on Time Delay (unit property)
- Outlet Control Mode
- Initial State
- Battery Capacity Threshold
- Power On Delay

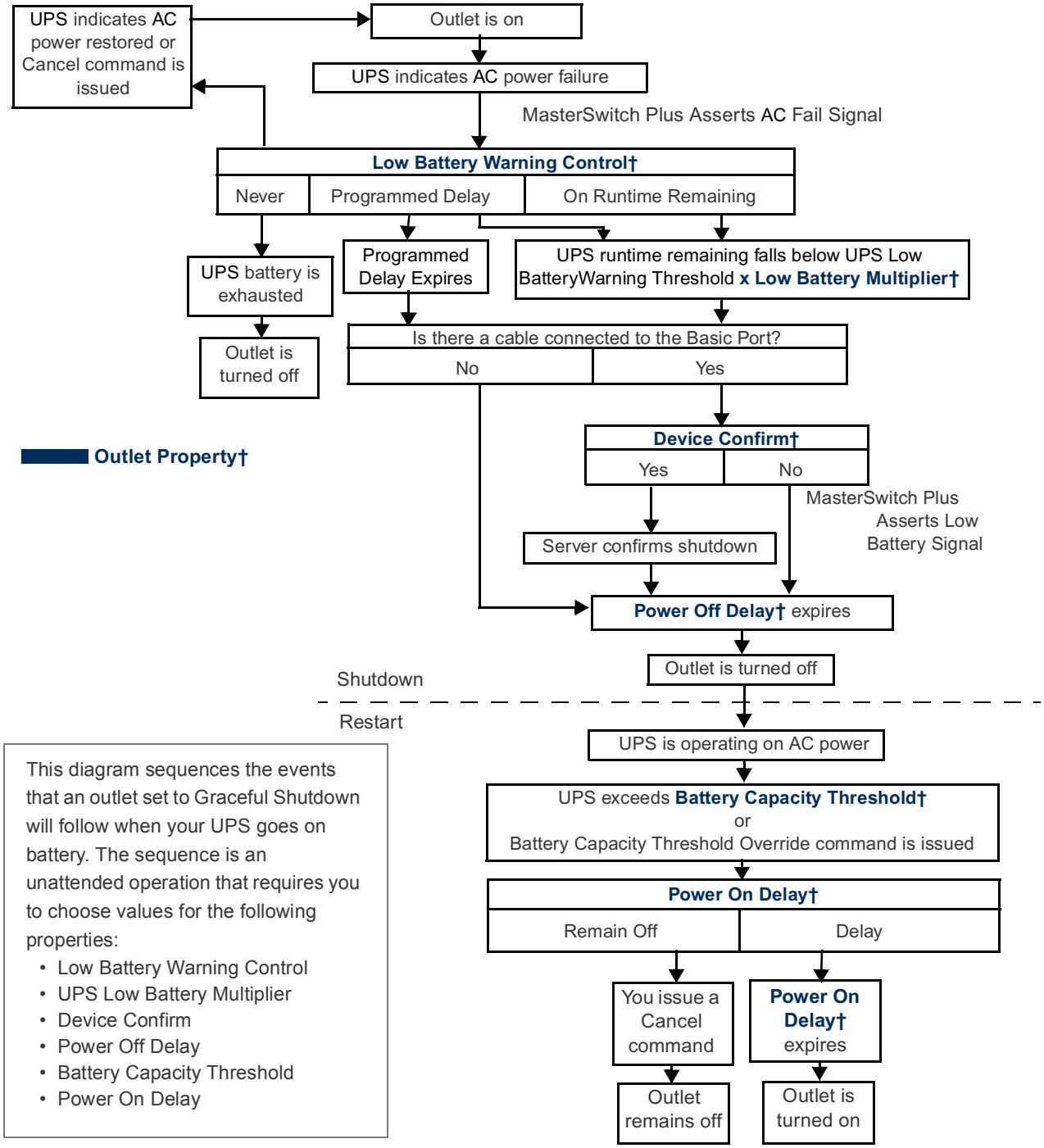
Graceful shutdown sequence



Graceful Shutdown is a coordinated effort between MasterSwitch Plus and the connected device to shutdown the device in an orderly manner. The Graceful Shutdown Sequence is an on-demand operation that requires you to choose values for the following properties:

- Device Confirm
- Power Off Delay
- Restart Delay
- Power On Delay

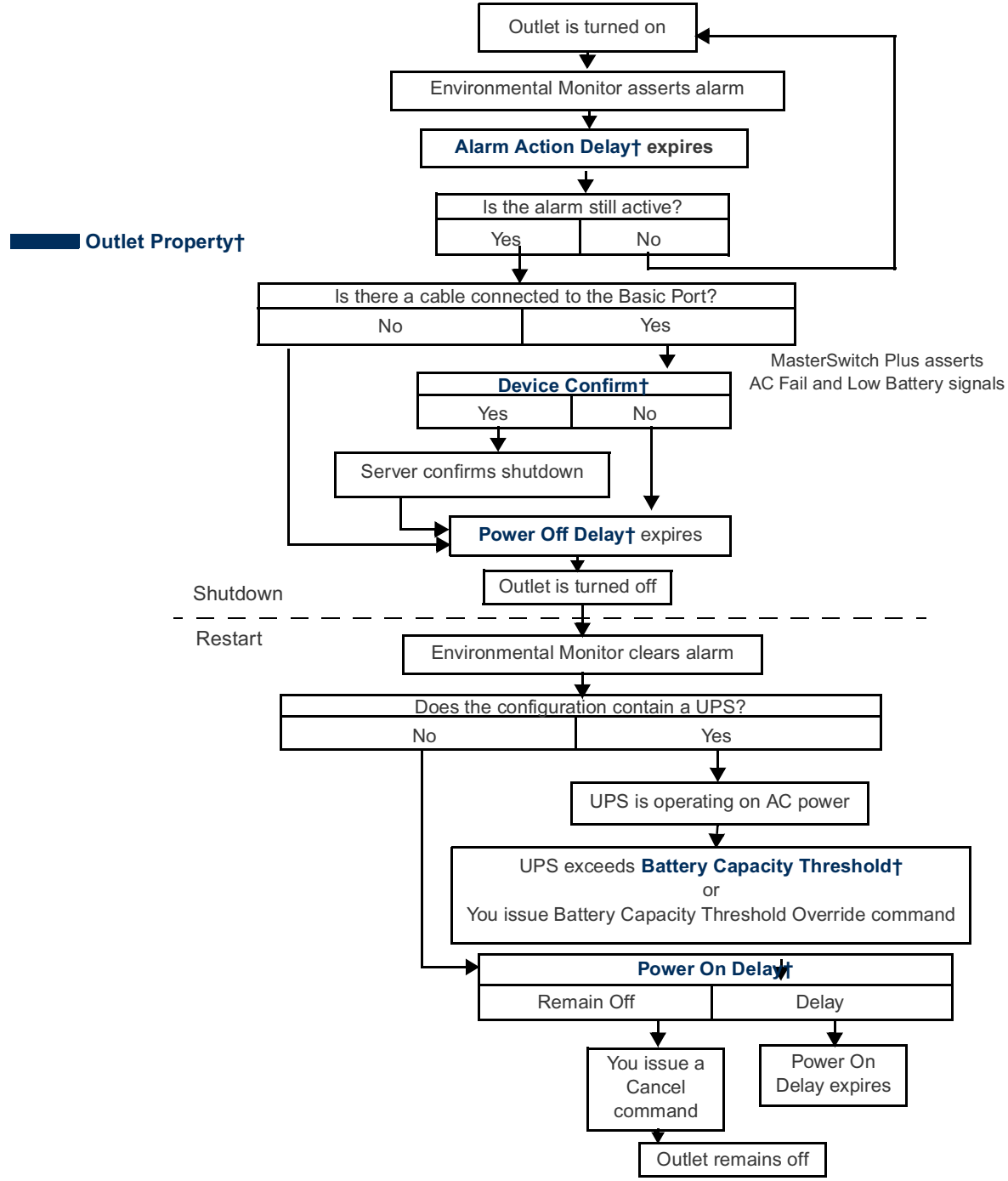
Graceful shutdown sequence for On-battery events



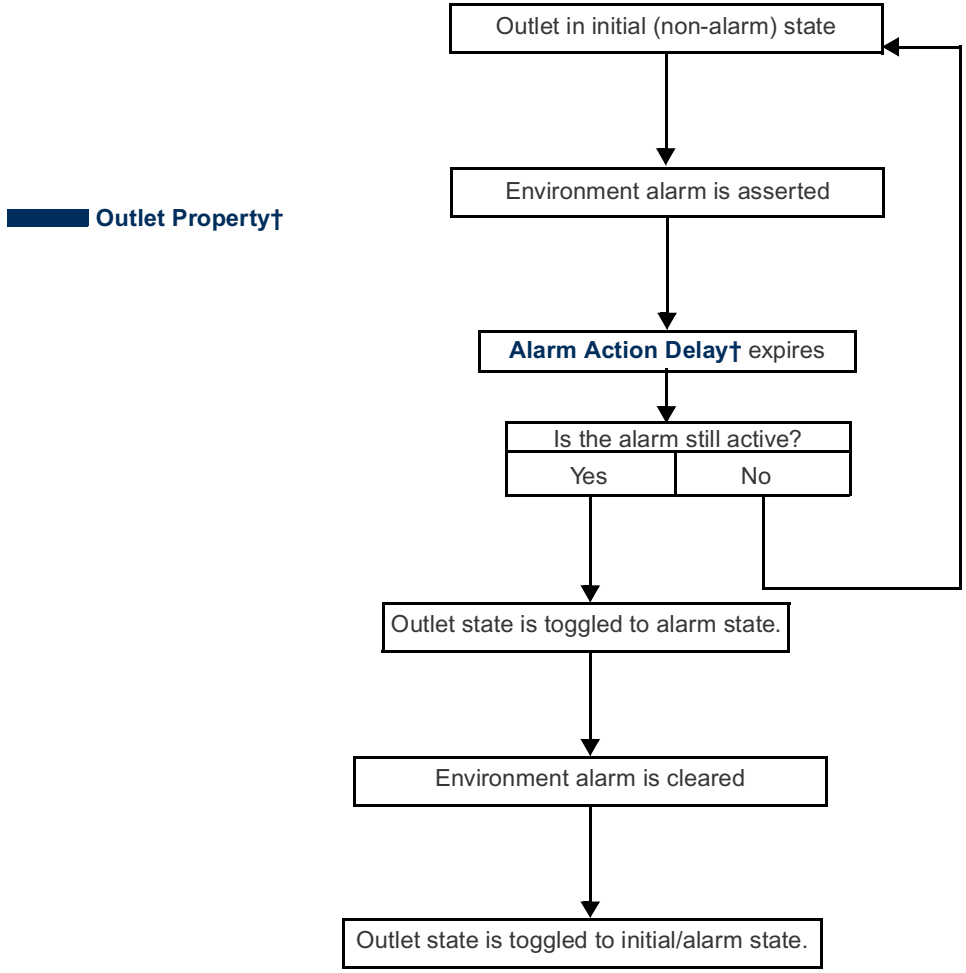
This diagram sequences the events that an outlet set to Graceful Shutdown will follow when your UPS goes on battery. The sequence is an unattended operation that requires you to choose values for the following properties:

- Low Battery Warning Control
- UPS Low Battery Multiplier
- Device Confirm
- Power Off Delay
- Battery Capacity Threshold
- Power On Delay

Graceful shutdown sequence for environment alarms

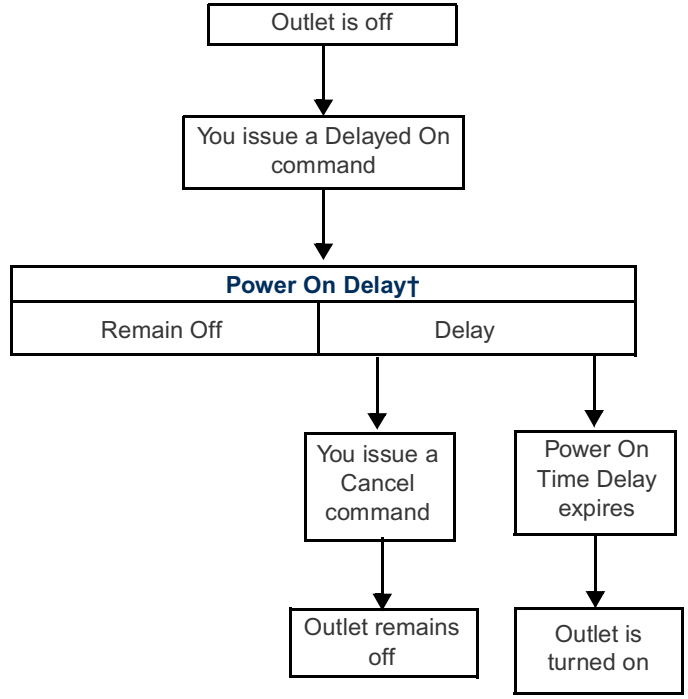


Annunciator sequence for environment alarms



This diagram sequences the events that an outlet set to Annunciator will follow when your Environmental Monitor issues an alarm. The sequence is an unattended operation that requires you to choose a value for the Alarm Action Delay property.

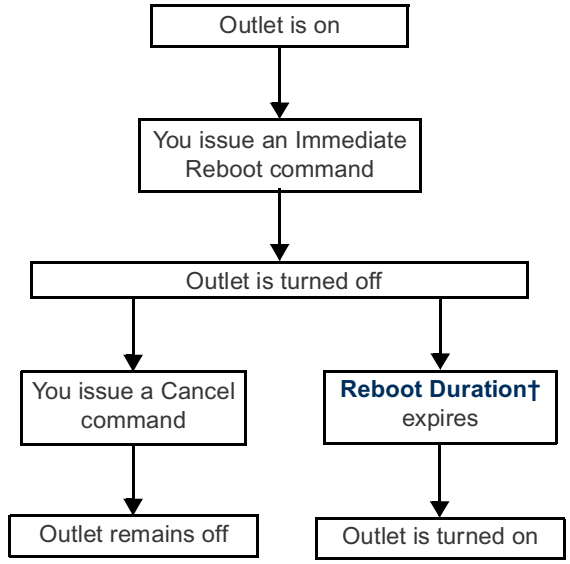
Delayed On sequence



Outlet Property†

This diagram sequences the events that an outlet will follow when you issue a Delayed On command. The sequence is an on-demand operation that requires you to choose a value for the Power On Delay property.

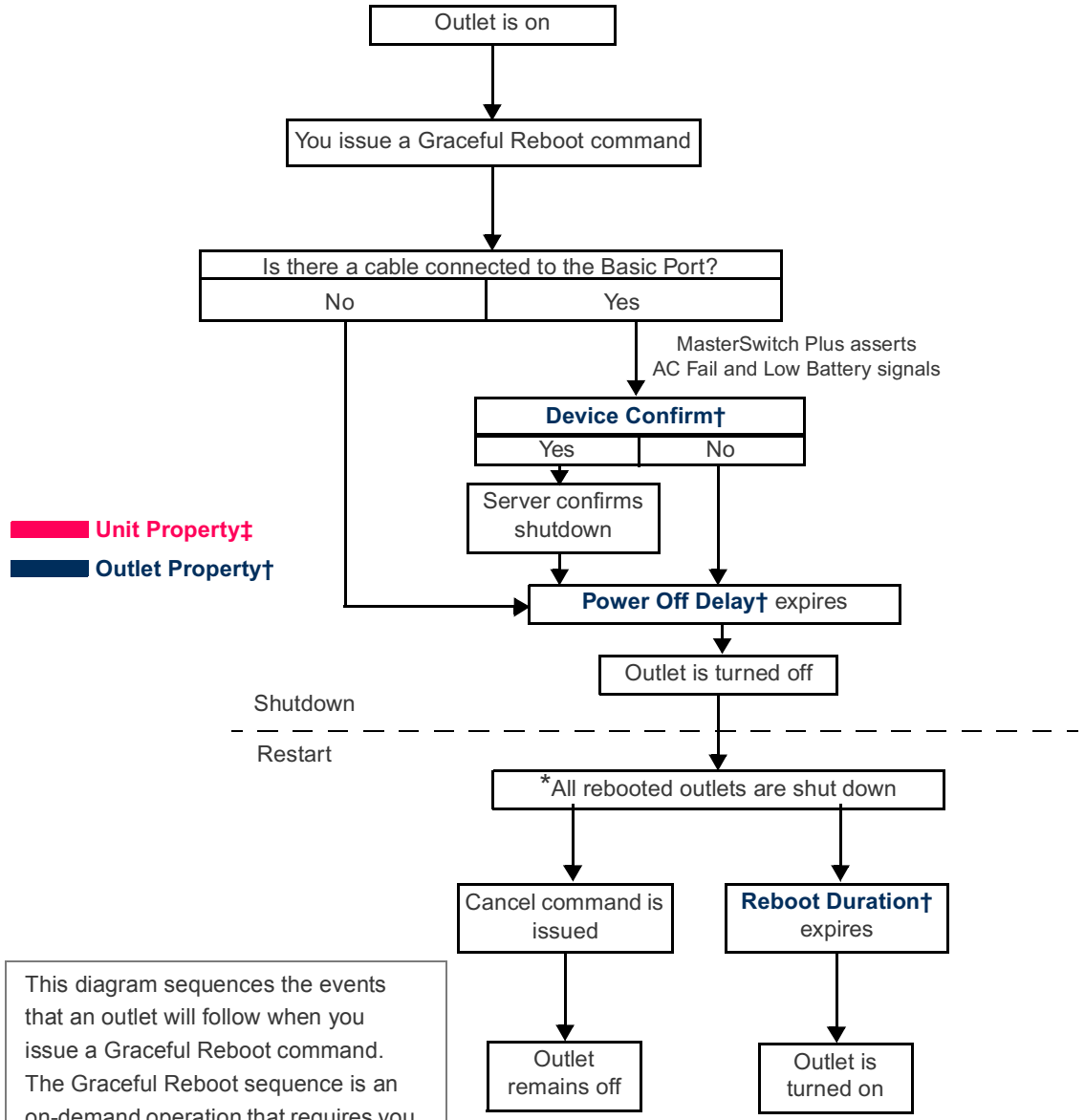
Reboot sequence



Outlet Property†

This diagram sequences the events that an outlet will follow when you issue an Immediate Reboot command. The sequence is an on-demand operation that requires you to choose a value for the Reboot Duration property.

Graceful reboot sequence



This diagram sequences the events that an outlet will follow when you issue a Graceful Reboot command. The Graceful Reboot sequence is an on-demand operation that requires you to choose values for the following properties:

- Will Device Confirm?
- Power Off Delay
- Reboot Duration

* If this command is applied to all outlets, the Reboot Duration delay for an outlet will not begin until all the outlets have shut down.

Control Console

How to Log On

Overview

You can use either a local (serial) connection, or a remote (Telnet) connection to access the control console.

Use case-sensitive user name and password entries to log on (by default, **apc** and **apc**, for an Administrator, or **device** and **apc**, for a Device Manager).

If you cannot remember your user name or password, see How to Recover From a Lost Password.

Remote access to the control console

You can use Telnet to log on to the control console.

1. At a command prompt, type `telnet` and the System IP address for the MasterSwitch Plus (when the unit uses the default telnet port of 23), and then press ENTER. For example:

   ```
   telnet 139.225.6.133
   ```

2. Enter your user name and password.

If the unit uses a non-default port number (between 5000 and 32767), include a colon or a space (depending on your Telnet client) after the IP address and then the port number.

Local access to the control console

You can use a local computer that connects to the MasterSwitch Plus through the serial port on the front of the unit.

1. Select a serial port at the local computer, and disable any service which uses that port.
2. Use the supplied serial cable (940-0024C) to connect the selected port to the serial port on the front of the MasterSwitch Plus.
3. Run a terminal program (such as HyperTerminal) and configure the selected port for 2400 bps, 8 data bits, no parity, 1 stop bit, and no flow control. Save the changes.
4. Press ENTER twice to display the **User Name** prompt.

Main Screen

Example main screen

The main screen that is displayed when you log on to the control console of a MasterSwitch Plus.

```
User Name : apc
Password  : ***


American Power Conversion               Network Management Card AOS    v1.1.6
(c) Copyright 2002 All Rights Reserved  MSP  APP                       v1.0.0
-------------------------------------------------------------------------------
Name      : MS Plus Rack 14                          Date : 6/20/2003
Contact   : Bill Cooper                              Time : 10:16:58
Location  : Data Center                              User : Administrator
Up Time   : 0 Days 0 Hours 43 Minutes                Stat : P+ N+ A+

MS plus 1: Serial Communication Established (MS Plus)

------- Control Console -------------------------------------------------------

     1- Device Manager
     2- Network
     3- System
     4- Logout

<ESC>- Main Menu, <ENTER>- Refresh, <CTRL-L>- Event Log
```

Information and status fields

Main screen information fields.

- Two fields identify the APC operating system (AOS) and application (APP) firmware versions. The application firmware uses a name that identifies the type of device that connects to the network. In the Example main screen, the application firmware for the MasterSwitch Plus is displayed.

```
Network Management Card AOS   v1.1.6
MSP APP                       v1.0.0
```

- Three fields identify the system **Name**, **Contact**, and **Location** values.

```
Name      : MS Plus Rack 14
Contact   : Bill Cooper
Location  : Data Center
```

To set the **Name**, **Contact**, and **Location** values, see System Menu.

- An **Up Time** field reports how long the MasterSwitch Plus has been running since it was last reset or since power was applied.

```
Up Time   : 0 Days 0 Hours 43 Minutes
```

- Two fields identify when you logged on, by **Date** and **Time**.

```
Date : 6/20/2003
Time : 10:16:58
```

- A **User** field identifies whether you logged on as Administrator or Device Manager.

```
User : Administrator
```

Main screen status fields.

- A **Stat** field reports the MasterSwitch Plus status.

```
Stat : P+ N+ A+
```

P+	The APC operating system (AOS) is functioning properly.
N+	The network is functioning properly.
N?	A BOOTP request cycle is in progress.
N–	The MasterSwitch Plus failed to connect to the network.
N!	Another device is using the IP address of the MasterSwitch Plus.
A+	The application is functioning properly.
A–	The application has a bad checksum.
A?	The application is initializing.
A!	The application is not compatible with the AOS.

If the AOS status is not P+, contact APC Worldwide Customer Support, even if you can still access the MasterSwitch Plus.

- A MasterSwitch Plus model and name field reports the status of the MasterSwitch Plus. For example:

```
MasterSwitch Plus: Serial Communication Established
```

Control Console Menus

Menu structure

The menus in the control console list options by number and name. To use an option, type the corresponding number and press ENTER, then follow any on-screen instructions.

For menus that allow you to change a setting, you must use the **Accept Changes** option to save the changes you made.

While in a menu, you can also do the following:

- Type ? and press ENTER to access brief menu option descriptions (if the menu has help available)
- Press ENTER to refresh the menu
- Press ESC to go back to the menu from which you accessed the current menu
- Press CTRL-C to return to the main (control console) menu
- Press CTRL-L to access the event log (Administrator and Device Manager only)

For information about the event log, see Event-Related Menus.

Main menu

The main control console menu has options that provide access to the management features of the control console:

```
1- Device Manager
2- Network
3- System
4- Logout
```

When you log on as Device Manager or as an Outlet User, you will not have access to the **System** or **Network** menus.

Device Manager option

This option accesses the **Device Manager** menu. Select the units you want to manage from this menu, each connected MasterSwitch Plus is available from this menu. See Device Manager Menus for a complete description of the available functions:

```
1- MasterSwitch plus 1
2- MasterSwitch plus 2
```

Network option

To do any of the following tasks, see Network Menu:

- Configure the TCP/IP settings for the MasterSwitch Plus
- Use the Ping utility
- Define settings that affect the FTP, Telnet, Web interface, SNMP, e-mail, and DNS features of the MasterSwitch Plus

System option

To do any of the following tasks, see System Menu:

- Control **Administrator** and **Device Manager** access
- Define the system **Name**, **Contact**, and **Location** values
- Set the date and time used by the MasterSwitch Plus
- Restart the MasterSwitch Plus
- Reset control console settings to their default values
- Access system information about the MasterSwitch Plus

Web Interface

How to Log On

Overview

You can use the DNS name or System IP address of the unit for the URL address of the Web interface. Use your case-sensitive user name and password settings to log on (by default, **apc** and **apc**, for an Administrator, or **device** and **apc**, for a Device Manager).

For information about the Web page that appears when you log on to the Web interface, see Summary Page.

If you use MD5 authentication, you must enter your 15 to 32 character authentication phrase to log on.

Supported Web browsers

You can use the Microsoft® Internet Explorer (IE) browser (5.0 and higher) or the Netscape® browser (4.0.8 and higher) to access the unit through its Web interface.

Some Web interface features (data verification, MD5 authentication, data log, and event log) require that you enable the following for your Web browser:

- JavaScript
- Java
- Cookies

In addition, the unit cannot work with a proxy server. Therefore, before you can use a Web browser to access its Web interface, you must do one of the following:

- Configure the Web browser to disable the use of a proxy server for the unit.
- Configure the proxy server so that it does not proxy the specific IP address of the unit.

URL address formats

Type the DNS name or IP address of the unit in the Web browser's URL address field and press ENTER. Except as noted below, `http://` is automatically added by the browser.

Note

If the error "You are not authorized to view this page" occurs (Internet Explorer only), another user is logged on to the Web interface or control console. If the error "No Response" (Netscape) or "This page cannot be displayed" (Internet Explorer) occurs, Web access may be disabled, or the unit may use a non-default Web-server port that you did not specify correctly in the address.

For more information, see FTP Server, and Telnet & Web options.

- For a DNS name of Web1, the entry is:

  `http://Web1`

- For a System IP address of 158.205.12.114, when the unit uses the default port (80) at the Web server, the entry is:

  `http://158.205.12.114`

- For a System IP address of 158.205.12.114, when the unit uses a non-default port (5000, in this example) at the Web server, the entry is:

  `http://158.205.12.114:5000`

Note

For Internet Explorer, you must type `http://` as part of the address when any port other than 80 is used. Omitting `http://`causes the error "This page cannot be displayed." For more information, see FTP Server, and Telnet & Web options.

Summary Page

When you log on to the Web interface at the MasterSwitch Plus, the status view is displayed at the right side of the screen, the quick status tab is displayed at the upper right, and the navigation menu is displayed at the left.

Status

The **Status** view has these sections:

- **MasterSwitch Plus Status** shows the status of each connected MasterSwitch Plus, MasterSwitch Plus expansion unit, and Environmental Monitoring Unit.
- **10/100 Management Card Status** shows the following:
  - **Name**, **Contact,** and **Location** information for the MasterSwitch Plus.
  - Date and Time the screen was last refreshed.
  - **User** (**Administrator** or **Device Manager**) type.
  - How long (**Up Time**) the MasterSwitch Plus has been running since it was last started or reset.

Quick status tab

The quick status tab is displayed in the upper right of every screen in the Web interface. The tab displays a warning of any alarms and provides a link to the online help.

	Access the online help for the displayed page.
	Click the green “device operating normally” icon to return to the status screen where the status for attached devices is displayed.
	Click the “attention required” icon to return to the status screen where active warnings and alarms are displayed.

Navigation Menu

Overview

When you log on to the Web interface, the navigation menu (left frame) includes the following elements:

- IP address of the unit
- MasterSwitch Plus menus to manage the unit and its components
  - **Outlets** menu
  - **MasterSwitch Plus** menu (for each attached unit)
- Menus to manage the event log, data log, network connection, and system parameters
  - **Events** menu
  - **Data** menu
  - **Network** menu
  - **System** menu

When you log on as a Device Manager, the **Network** and **System** menus do not appear in the navigation menu.

- **Logout** option
- **Help** menu
- **Links** menu

Select a menu to perform a task

To do the following, see the Outlets Menu:

- Control power to any of the individual AC outlets on the rear panel of the unit.
- Control power to all of the AC outlets on the rear panel of the unit.

To do the following, see the MasterSwitch Plus Menus:

- Set the device name.
- Set the **Power On Time Delay**.
- Set outlet names and modes.
- Enable and disable environmental alarm actions.

To do the following, see Event-Related Menus:

- Access the event log.
- Configure the actions to be taken based on an event's severity level.
- Configure SNMP Trap Receiver settings for sending event-based traps.
- Define who will receive e-mail notifications of events.
- Test e-mail settings.

To do the following, see Network Menu:

- Configure new TCP/IP settings for the unit.
- Identify the Domain Name Service (DNS) Server and test the network connection to that server.
- Define settings that affect FTP, Telnet, the Web interface, SNMP, and e-mail.

To do the following, see System Menu:

- Control **Administrator** and **Device Manager** access.
- Define the system **Name**, **Contact**, and **Location** values.

- Set the date and time used by the unit.
- Restart the unit.
- Reset control console settings to default settings.
- Define the URL addresses of the user links and APC logo links in the web interface, as described in Links menu.

Help menu

When you click **Help**, the **Contents** for all of the online help is displayed. However, from any Web interface pages, you can use the question mark (**?**) in the quick status bar to link to the section of the online help for that page.

The **Help** menu also has an **About System** option you use to view information about the unit's **Model Number**, **Serial Number**, **Hardware Revision**, **Manufacture Date**, **MAC Address, Application Module,** and **APC OS (AOS) Module**, including the date and time each of the two modules were created.

In the control console, the **About System** option, which is a **System** menu option, identifies the **Flash Type** used.

Links menu

Provides three user-definable URL link options. By default, these links access the following APC Web pages:

- **APC's Web Site** accesses the APC home page.
- **Testdrive Demo** accesses a demonstration page where you can use samples of APC web-enabled products.
- **APC Monitoring** accesses the "APC Remote Monitoring Service" page about pay-for-monitoring services available from APC.

To redefine these links so that they point to other URLs:

1. Click on **Links** in the **System** menu.
2. Define any new names for **User Links**.
3. Define any new URL addresses that you want **User Links** to access. Only HTTP links may be defined.
4. Click **Apply**.

The link associated with the APC logo is also definable.

MasterSwitch Plus Menus

Outlets Menu

Control Outlets

Web interface. To control all of the outlets at once, select a **Control Action** under the Master heading and click **Apply**.

To control individual outlets, select a **Control Action** for each outlet under the individual outlets heading, and click **Apply**.

Control console. To control all outlets at once, select the MasterSwitch Plus unit you want to control from the **Device Manager** menu, and select option 9 - **ALL Outlets**. Select **Outlet Control** and a control action. Type YES and press ENTER to execute the change.

To control outlets individually, select the MasterSwitch Plus unit you want to control from the **Device Manager** menu, and select the outlet you want to control. Select **Outlet Control** and choose a control action from the list. Type YES and press ENTER to execute the change.

Action Name	Description	Available Modes
Immediate On	Immediately turns an outlet on. This command is available anytime after the unit's Power On Time Delay has expired and the outlet is off. (Available in both Annunciator and Graceful Shutdown modes.)	Annunciator Graceful Shutdown
Sequenced On	Apply power to the outlet according to its Power On Delay Time. Only available for master control of outlets in graceful shutdown mode.	Graceful Shutdown Only

Action Name	Description	Available Modes
Delayed On	Apply power to the outlet after its Power On Delay expires. Only available in graceful shutdown mode.	Graceful Shutdown Only
Immediate Off	Immediately removes power from an outlet.	Annunciator Graceful Shutdown
Graceful Reboot	Removes and then reapplies power to an outlet. If the connected server is running shutdown software, such as PowerChute Network Shutdown, and is connected to MasterSwitch Plus with the appropriate signaling cable, this operation will ensure that your server's operating system is shut down before power is removed from the outlet. If the server is not connected to the MasterSwitch Plus, then MasterSwitch Plus will remove power from the outlet after the Power Off Time Delay expires. Power is reapplied after the Reboot duration expires. If this command is applied to all outlets, the Reboot Duration delay for an outlet will not begin until all the outlets have shut down.	Graceful Shutdown Only
Immediate Reboot	Immediately removes power from an outlet and reapplies power after the outlet's Reboot Duration expires.	Graceful Shutdown Only

Action Name	Description	Available Modes
Shutdown	Removes power and then optionally reapplies power to an outlet. If the connected server is running shutdown software, such as PowerChute Network Shutdown, and is connected to MasterSwitch Plus with the appropriate signaling cable, this operation will ensure that your server's operating system is shut down before power is removed from the outlet. If the server is not connected to the MasterSwitch Plus, MasterSwitch Plus will remove power from the outlet after the Power Off Time Delay expires. Specify a Restart delay to reapply power automatically.	Graceful Shutdown Only
Override	If the UPS battery charge has not exceeded the Battery Capacity Threshold, selecting the override action will allow power to be applied to an outlet.	Graceful Shutdown Only
Cancel	Cancel a delayed startup or shutdown.	Graceful Shutdown Only

Configure Outlets

Web interface. Click the outlet number link (for example 1:3) and make changes to **Outlet Name**, **Outlet Mode**, and **Outlet Links**. Click **Apply** to accept the changes.

Control console. To configure outlets individually, select the MasterSwitch Plus unit you want to control from the **Device Manager** menu, and select the outlet you want to configure. Select **Outlet Configuration** and choose a configuration setting from the list. Select **Accept Changes** to apply the new settings.

Setting	Description
Outlet Name	Identifies each outlet.
Outlet Control Mode	Establishes mode for associated outlet. All on-demand operations are available when the Outlet Control mode is set to Graceful Shutdown. When set to Annunciator, only Immediate On and Immediate Off operations are available.
Outlet Link (Web only)	The Outlet's HTTP link in URL form or a Telnet address.
Will Device Confirm	Indicates whether the device connected to the outlet can assert a shutdown signal.
Low Battery Warning Control	Selects the method MasterSwitch Plus uses for determining when to assert the outlet's Low Battery signal after the UPS has switched to battery operation.
UPS Low Battery Multiplier	A low battery signal is generated when the UPS's remaining battery runtime falls below this value multiplied by the UPS Low Battery Warning.
Restart Delay	The delay between removing power from an outlet due to a Graceful Shutdown and reapplying power to that outlet.
Power Off Delay	The time from the triggering event (such as a server confirming a shutdown) until power is removed from the outlet.

Setting	Description
Power On Delay	Determines the time interval between the triggering event and power being applied to the outlet.
Reboot Duration	The delay between removing power from an outlet because of a reboot and reapplying power to an outlet.
Alarm Action Delay	The amount of time that an Environment alarm must be asserted before the unit reacts to the alarm.
Battery Capacity Threshold	Sets the minimum percentage of Battery Capacity required of the UPS before power can be applied to an outlet.

MasterSwitch + Menu

Device Config (Outlet Config in Control Console)

Web interface. To set the name of the device, the Power On Delay for the outlets for this device, and to disable or enable the Manual button on the front of the MasterSwitch Plus, select the MasterSwitch **+** menu, change the setting you wish to modify, and click **Apply**.

Control console. To set the name of the device, the **Power On Delay** for the outlets for this device, and to disable or enable the Manual button on the front of the MasterSwitch Plus, select the **Device Manager** menu. Select the MasterSwitch Plus or expansion unit you want to modify and then select **ALL Outlets**. Change the **Name/Location**, **Manual Button**, and **Power On Time Delay** fields, and then select **Accept Changes** to apply the new settings.

Setting	Description
Name	Set the name for this MasterSwitch Plus unit.
Manual Button	Activate or deactivate the **Manual** button on the front panel of the unit.
Power On Time Delay	Set how long the MasterSwitch Plus will delay after AC power is applied, before starting the outlet's power-on sequence.
Restore Factory Defaults (Control console only)	Resets the original settings for the MasterSwitch Plus unit. All unit and outlet properties are set to their defaults.
View Manufacuring Data	Displays the following information: Model Number, Manufacture Date, Hardware Rev, Firmware Rev, and Serial Number. The Web interface displays this data under the **Help** menu.
View Self Test Results (Control console only)	Allows you to display the results of the unit's last power-on self-test. The tests performed are: **Program Memory**: Confirms that the EPROM chip is working properly. **Non-Volatile Memory**: Confirms that the EEPROM chip is working properly.

Configure Environmental Alarms

Web interface. Click the **Outlet Config** menu under the MasterSwitch Plus unit you want to configure. Select the Environmental alarms to enable or disable by selecting the checkboxes under each **Enable/Disable Environment Alarm Actions** heading:

- **Zones 1–4**
- **Probe 1**
- **Probe 2**

Click the **Apply** button under each heading to accept the changes.

The Environmental Alarms apply only if you have an Environmental Monitoring card installed in an expansion unit, or if the MasterSwitch Plus is connected to an Environmental Monitoring Unit.

Control console. Select the MasterSwitch Plus unit you want to configure from the **Device Manager** menu, and select the outlet you want to configure. Select **Environmental Alarms Configuration** and choose a configuration setting from the list. Select **Accept Changes** to apply the new settings.

Setting	Definition
Zone 1	Controls the Zone 1 environmental alarm.
Zone 2	Controls the Zone 2 environmental alarm.
Zone 3	Controls the Zone 3 environmental alarm.
Zone 4	Controls the Zone 4 environmental alarm.
Probe 1 Humidity Low Limit	Controls the humidity low limit alarm for the first temperature and humidity probe.

Setting	Definition
Probe 1 Humidity High Limit	Controls the humidity high limit alarm for the first temperature and humidity probe.
Probe 1 Temp Low Limit	Controls the temperature low limit alarm for the first temperature and humidity probe.
Probe 1 Temp High Limit	Controls the temperature high limit alarm for the first temperature and humidity probe.
Probe 2 Humidity Low Limit	Controls the humidity low limit alarm for the second temperature and humidity probe.
Probe 2 Humidity High Limit	Controls the humidity high limit alarm for the second temperature and humidity probe.
Probe 2 Temp Low Limit	Controls the temperature low limit alarm for the second temperature and humidity probe.
Probe 2 Temp High Limit	Controls the temperature high limit alarm for the second temperature and humidity probe.

Managing the Expansion Unit

Introduction

Overview

If you have purchased only the MasterSwitch Plus Expansion Unit (AP9225 EXP) and your configuration does not include an AP9225, you can configure the Expansion Unit through MasterSwitch Plus internal menus.

Local access to the control console

You can use a local computer that connects to the MasterSwitch Plus through the serial port on the front of the unit.

1. Select a serial port at the local computer, and disable any service which uses that port.
2. Use the supplied serial cable (940-0024C) to connect the selected port to the serial port on the front of the MasterSwitch Plus.
3. Run a terminal program (such as HyperTerminal) and configure the selected port for 2400 bps, 8 data bits, no parity, 1 stop bit, and no flow control. Save the changes.
4. Press ENTER to access the internal menus.

When logging on, you will not need a user name.

Navigating the internal interface

The MasterSwitch plus menus allow you to manage the MasterSwitch Plus expansion unit and an Environmental Monitoring Card. All menus list items by number and name.

- To enter a selection on any of the menus, type its related one- or two-character command and press ENTER.
- To see the results of the last changes you have made, it may be necessary to press ENTER.
- To return to the previous screen, press ESC.
- To exit the MasterSwitch Plus internal menus, type Q (case-sensitive) at the Main menu.

Main Menu

Item	Description
Version	Displays the version of the MasterSwitch Plus firmware.
Unit Name	Identifies the MasterSwitch Plus unit that has been accessed. **NOTE:** The Unit Name can be changed in the **Unit Properties** menu.
UPS State	Displays the status of the UPS. The possible states are: • **Inactive** — UPS is in sleep mode. • **On Line** — UPS is operating normally. • **AC Fail** — UPS is operating on battery. • **Unknown** — Communication with UPS has failed.
Outlet Name	Identifies each outlet. **NOTE:** Each outlet's name is changeable at the associated outlet properties menu.
Outlet State	Displays the current state of the outlet. The possible states are: • **On** — Outlet is turned on. • **On in hh:mm:ss** — Outlet will be turned on after the specified time period elapses. • **Off** — Outlet is turned off. • **Off in hh:mm:ss** — Outlet will be turned off after the specified time period elapses.
To Change Unit Properties	Instructs you to enter a U to access the **Unit Properties** menu. **NOTE:** The **Enable/Disable Alarms** setting on the **Outlet Properties** menus controls the behavior of an individual outlet with regard to Environment alarms.
To Change Outlet Properties	Instructs you to enter the associated outlet number (1– 8) to access its outlet properties.
To Change Environmental Monitoring Card Properties	Instructs you to enter M to access the Environmental Monitoring Card properties menu (available only if an Environmental Monitoring Card is present).

Item	Description
To Change Units	Instructs you to enter a I to access the next MasterSwitch Plus unit in the cascading setup.
To Change Outlet States	Instructs you to enter various commands to initiate on-demand outlet actions. After entering a command, you will be asked to enter an outlet number (1– 8) to perform the action on the associated outlet or you will be asked to enter an A to perform the action on all of the outlets. The commands you may enter are: • **N** — On: Immediately turns an outlet on. • **TS** — Shutdown: Gracefully shuts down and optionally restarts an outlet. • **C** — Cancel: Cancels a delayed startup or shutdown. • **D** — Delayed On:Turns an outlet on after the outlet's Turn On Delay expires. • **F** — Off: Immediately turns an outlet off. • **R** — Reboot: Immediately turns an outlet off and turns it back on after the outlet's Reboot Duration expires. • **Y** — Graceful Reboot: Gracefully shuts down and restarts an outlet. • **O** — Override: Allows an outlet to restart when the UPS battery charge has not exceeded the Battery Capacity Threshold.

Unit Properties Menu

Item	Description
Name	Set the name of this MasterSwitch Plus unit. A maximum of 23 printable ASCII characters is allowed.
Address	Specify the unit's address (1– 4) in a cascading setup. Enter 1 for the unit connected closest to the UPS, 2 for the unit adjacent to unit 1, and so on for up to four units. See the *Installation and Quick-Start manual* for instructions on setting up Expansion Unit addresses. **NOTE:** If the addresses for all units are not set up properly, the units will not operate properly.
Manual Button	Enable/disable the unit's Manual button located on the front panel of the unit.
Password	Set the unit's password. The password is case-sensitive and can be up to 9 printable characters.
Restore Factory Defaults	Resets the original settings for the MasterSwitch Plus unit. All unit and outlet properties are set to their defaults.
View Manufacturing Data	Displays the following information: Model Number, Manufacture Date, Hardware Rev, Firmware Rev, and Serial Number. These items cannot be configured.
View Self-Test Results	Allows you to display the results of the unit's last power-on self-test. The tests performed are: **Program Memory**: Confirms that the EPROM chip is working properly. **Non-Volatile Memory**: Confirms that the EEPROM chip is working properly.
Menu Timeout Period	Automatically logs you off after the specified period of inactivity.
Power On Time Delay	The time that the MasterSwitch Plus will delay after AC power is applied before starting the outlet's power-on sequence.

Outlet Properties Menu

Overview

MasterSwitch Plus has eight **Outlet Properties** menus—one for each outlet. To access these menus, enter an outlet number (1– 8) from the **Main menu**. The **Outlet Properties** menu varies according to the **Outlet Control** mode setting of the chosen outlet.

Graceful Shutdown menu items

Item	Definition
Outlet Name	Identifies each outlet.
Outlet Control Mode	Establishes mode for associated outlet.
Will Device Confirm	Indicates whether the device connected to the outlet can assert a shutdown signal.
Low Battery Warning Control	Selects the method MasterSwitch Plus uses for determining when to assert the outlet's Low Battery signal after the UPS has switched to battery operation.
UPS Low Battery Multiplier	A low battery signal is generated when the UPS's remaining battery runtime falls below this value multiplied by the UPS Low Battery Warning.
Restart Delay	The delay between removing power from an outlet due to a Graceful Shutdown and reapplying power to that outlet.
Power Off Delay	The time from the triggering event (such as a server confirming a shutdown) until power is removed from the outlet.
Power On Delay	Determines the time interval between the triggering event and power being applied to the outlet.
Reboot Duration	The delay between removing power from an outlet because of a reboot and reapplying power to an outlet.

Item	Definition
Battery Capacity Threshold	Sets the minimum percentage of Battery Capacity required of the UPS before an outlet can be turned on.
Enable/Disable UPS Alarms	Environment Alarm Masks: Indicates whether or not an outlet will react to a specific Environment alarm.
Select Another Outlet	Allows you choose another outlet to configure.
Alarm Action Delay	The amount of time that an Environment alarm must be asserted before the unit reacts to the alarm.

Annunciator menu items

Item	Definition
Outlet Name	Identifies each outlet.
Outlet Control Mode	Set the mode for the associated outlet: Graceful Shutdown or Annunciator.
Initial State	Defines the initial state of the outlet.
Alarm Action Delay	The amount of time that an Environment alarm must be asserted before the unit reacts to the alarm.
Enable/ Disable UPS Alarms	Environment Alarm Masks: Indicates whether an outlet will react to a specific Environment alarm. Settings are **Enabled** and **Disabled** for each of the 12 Environmental Monitoring Card alarms.
Select Another Outlet	Choose an another outlet to configure.

Environmental Monitoring Card menu

Item	Description
Temp (Celcius)	Displays the current ambient temperature reading of each attached probe. Temperature is displayed in *nn.nn* degrees Celsius.
Humidity	Displays the current relative humidity reading of each attached probe. Humidity is displayed in *nnn.n*% relative humidity.
Low Limit	Allows you to disable or set the low alarm threshold for temperature and humidity for each probe. Temperature threshold is in degrees Celsius and humidity is in percentage of relative humidity. If alarm limits are exceeded, an alarm will be asserted to all outlets whose Enable/Disable Alarm settings for that alarm are set to Enabled.
High Limit	Allows you to disable or set the high alarm threshold for temperature and humidity for each probe. Temperature threshold is in degrees Celsius and humidity is in percentage of relative humidity. If alarm limits are exceeded, an alarm will be asserted to all outlets whose Enable/Disable Alarm settings for that alarm are set to Enabled.
Disable All Alarms	Allows you to control Environmental Monitoring Card operation. The options are: • **Yes** — All alarm limits are set to Disabled. MasterSwitch Plus will ignore all Environment alarms. • **No** — All alarm limits are reset to previous configuration.

Event-Related Menus

Introduction

Overview

The **Events** menu provides access to the options that you use to do the following tasks:

- Access the event log
- Define the actions to be taken when an event occurs, based on the severity level of that event
  - Event logging
  - SNMP trap notification
  - E-mail notification

Note

You can use only the Web interface to define which events will use which actions, as described in Event Log and How to Configure Individual Events.

- Define up to four SNMP trap receivers, by Network Management Station (NMS)-specific IP address, for event notifications by SNMP traps.
- Define up to four recipients for event notifications by e-mail.

Menu options

In the Web interface, all of the events options are accessed through the **Events** menu.

In the control console, access the available events-related options as follows:

- Use the **Email** option in the **Network** menu to define the SMTP server and e-mail recipients.
- Use the **SNMP** option in the **Network** menu to define the SNMP trap receivers.
- Use CTRL-L to access the event log from any menu.

For information on the following topics, use these links:

- Event Log
- Event Actions (Web Interface Only)
- Event Recipients
- E-mail Feature
- How to Configure Individual Events

Event Log

Overview

The unit supports event-logging for all Network Management Card application firmware modules. To record and display Network Management Card and unit events, use any of the following to view the event log:

- Web interface
- Control console
- FTP

Logged events

By default, any event which causes an SNMP trap will be logged, except for SNMP authentication failures. Additionally, the unit will log its abnormal internal system events. However, you can use the **Actions** option in the Web interface's **Events** menu to disable the logging of events based on their assigned severity level, as described in Event Actions (Web Interface Only).

Some System (Network Management Card) events do not have a severity level. Even if you disable the event log for all severity levels, events with no severity level will still be logged.

To access a list of the System (Network Management Card) and MasterSwitch Plus (Device) events, see Event List page.

Web interface

The **Log** option in the **Events** menu accesses the event log. This log displays all of the events that have been recorded since the log was last deleted, in reverse chronological order. The **Delete Log** button clears all events from the log.

Control console

Press CTRL-L to display up to 300 events from the event log, in reverse chronological order. Use the SPACE BAR to scroll through the recorded events. While viewing the log, type `d` and press ENTER to clear all events from the log.

After events are deleted, they cannot be retrieved.

How to use FTP to retrieve log files

You can use FTP to retrieve a tab-delineated event log (*event.txt*) file that you can import into a spreadsheet application.

- The file reports all of the events (*event.txt*) recorded since the log was last deleted.
- The file includes information that the event log does not display.
  - The version of the file format (first field)
  - The date and time the file was retrieved
  - The **Name**, **Contact**, and **Location** values, and the IP address of the unit
  - In the *event.txt* file, the unique event code for each recorded event

The unit uses a 4-digit year for log entries. You may need to select a four-digit date format in your spreadsheet application to display all four digits of the year.

To use FTP to retrieve the *event.txt* file:

1. At a command prompt, type `ftp` and the IP address of the MasterSwitch Plus, and press ENTER. If the **Port** setting for **FTP**

Server in the **Network** menu has been changed from its default value (*21*), you must use the non-default value in the FTP command. For some FTP clients, you must use a colon to add the port number to the end of the IP address. For Windows FTP clients, use the following command (including spaces):

```
ftp>open ip_address port_number
```

2. Use your case-sensitive user name and password to log on as either an Administrator or a Device Manager User.
   - For Administrator, **apc** is the default for user name and password.
   - For Device Manager, device is the default for user name, and **apc** is the default for password.
3. Use the **get** command to transmit the text version of the event log to your local drive.

   ```
   ftp>get event.txt
   ```
4. You can use the **del** command to clear the contents of the event log.

   ```
   ftp>del event.txt
   ```

   You will not be asked to confirm the deletion.

Note

If you clear the event log, a new *event.txt* file will be created to record the Deleted Log event.

5. Type `quit` at the `ftp>` prompt to exit from FTP.

Event Actions (Web Interface Only)

Overview

The **Actions** option is available only on the Web interface's **Events** menu. This option allows you to select which actions will occur for events that have a specified severity level:

- **Event Log** selects which severity levels cause an event to be recorded in the event log. See Event log action.
- **SNMP Traps** selects which severity levels cause SNMP traps to be generated. See SNMP traps action.
- **Email** selects which severity levels cause e-mail notifications to be sent. See Email action.

Click **Details** to access a complete list of the System (Network Management Card) and Device (MasterSwitch Plus) events that can occur, and then edit the actions that will occur for an individual event, as described in How to Configure Individual Events. Click **Hide Details** to return to the **Actions** option.

Modifying events on the **Configure Event Action by Severity Level** page will override any changes you have made to individual events on the **Details** page.

Severity levels

Except for some System (Network Management Card) events that do not have a severity level, events are assigned a default severity level based on their seriousness:

- **Informational:** Indicates an event that requires no action, such as a notification of a return from an abnormal condition.
- **Warning:** Indicates an event that may need to be addressed if the condition continues, but does not require immediate attention.
- **Severe:** Indicates an event that requires immediate attention. Unless resolved, severe Device and System events can cause incorrect operation of the unit or its Network Management Card.

Event log action

You can disable the recording of events in the event log. By default, all events are recorded, even events that have no severity level assigned.

Even if you disable the event log action for all severity levels, system (Network Management Card) events that have no severity level assigned will still be logged.

For more information about this log, see Event Log.

SNMP traps action

By default, the **SNMP Traps** action is enabled for all events that have a severity level assigned. However, before you can use SNMP traps for event notifications, you must identify the network management stations (NMSs) that will receive the traps by their IP addresses.

To define up to four NMSs as trap receivers, see Event Recipients.

Email action

By default, the **Email** action is enabled for all events that have a severity level assigned. However, before you can use e-mail for event notifications, you must define the e-mail recipients.

See E-mail Feature.

Event Recipients

Overview

The Web interface and control console both have options that allow you to define up to four trap receivers and up to four e-mail addresses to be used when an event occurs that has the SNMP traps or e-mail enabled.

See Event Actions (Web Interface Only)

Trap receiver settings

To define which NMSs will receive traps:

- In the Web interface, use the **Recipients** option of the **Events** menu.
- In the control console, use the **SNMP** option in the **Network** menu. Choose one of the trap receivers to modify, or select **Settings** and enable SNMP access for all trap receivers.

Item	Definition
Community Name	This setting defines the password (maximum of 15 characters) used when traps are sent to the NMS identified by the **Receiver NMS IP** setting.
Receiver NMS IP	Identifies by IP address the NMS that will receive traps. If this setting is **0.0.0.0** (the default value), traps will not be sent to any NMS.
Generation (Web interface) Trap Generation (control console)	Enables (by default) or disables the sending of any traps to the NMS identified by the **Receiver NMS IP** setting.
Authentication Traps	Enables or disables the sending of authentication traps to the NMS identified by the **Receiver NMS IP** setting.

E-mail Feature

Overview

You can use the Simple Mail Transfer Protocol (SMTP) to send e-mail to up to four recipients when an event occurs.

To use the e-mail feature, you must define the following settings:

- The IP addresses of the primary and secondary Domain Name Service (DNS) servers, as described in DNS servers
- The DNS name of the SMTP server and the **From Address** setting for SMTP, as described in SMTP settings
- The e-mail addresses for a maximum of four recipients, as described in Email recipients

DNS servers

The unit cannot send any e-mail messages unless the IP address of the primary DNS server is defined (see DNS servers).

The unit will wait a maximum of 15 seconds for a response from the primary or (if specified) the secondary DNS server. If the unit does not receive a response within that time, e-mail cannot be sent. Therefore, use DNS servers that are on the same segment as the unit or on a nearby segment (but not across a WAN).

Once you define the IP addresses of the DNS servers, verify that DNS is working correctly. Enter the DNS name of a computer on your network to test whether you can look up the IP address for that DNS name.

SMTP settings

The **Email** option in the **Network** menu accesses the following settings:

Setting	Description
SMTP Server	Defines the SMTP server by its DNS name. **Note**: This definition is required only when the **SMTP Server** option (see Email recipients) is set to **Local**.
From Address	Defines the contents of the **From** field in the e-mail messages sent by the unit. **Note**: The SMTP server's configuration may require that you use a valid user account on the server for this setting. See the server's documentation for more information.

Email recipients

In the Web interface, the **Recipients** option of the **Events** menu or the **Configure the Email recipients** link in the **Email Configuration** page accesses the settings you use to identify up to four e-mail recipients.

In the Web interface, use the **Email Test** option to send a test message to a configured recipient.

In the control console, the **Email** option of the **Network** menu accesses the e-mail recipients settings.

Setting	Description
To Address	Defines the user and domain names of the recipient. • To bypass the DNS lookup of the mail server's IP address, use the IP address in brackets instead of the e-mail domain name. For example, use jsmith@[xxx.xxx.xxx.xxx] instead of jsmith@company.com. This is useful when DNS lookups are not working correctly. • To use e-mail for paging, use the e-mail address for that recipient's pager gateway account (for example, `myacct100@skytel.com`). The pager gateway pages the recipient. The recipient's pager must be able to use text-based messaging.

Setting	Description

SMTP Server	Selects one of the following methods for routing e-mail:
	• Through the SMTP server provided with the unit (the recommended option, **Local**). This option ensures that the e-mail is sent before the 20-second time-out for the unit, and, if necessary, is retried several times. Also do one of the following:
	  • Enable forwarding at the SMTP server provided with the unit so that it can route e-mail to external SMTP servers. Typically, SMTP servers are not configured to forward e-mail. Always check with the administrator of your SMTP server before changing its configuration to allow forwarding.
	  • Set up a special e-mail account for the unit to forward e-mail to an external mail account.
	• Directly to the recipient's SMTP server (the **Recipient's** option). On a busy remote SMTP server, the time-out may prevent some e-mail from being sent, and with this option the unit tries to send the e-mail only once.
	When the recipient uses the SMTP server provided with the unit, the **Recipient's** setting has no effect.

Generation	Enables (by default) or disables sending e-mail to the recipient.
Format	Selects the format used for e-mail messages: **Short**: Identifies only the event that occurred. For example: MasterSwitch Plus: Outlet 01 on device turned on **Long**: Includes information about the unit, and the event. For example: Name: TestLab Location: Building 3 Contact: DonAdams http://139.225.6.133 MasterSwitch Plus Ser #: WS0131005294 Date: 3/10/2003 Time: 16:09:48 Code: 0x120C Warning - MasterSwitch Plus: Outlet 01 on device turned on

How to Configure Individual Events

Event List page

The **Actions** option in the **Events** menu opens the **Event Action Configuration** page on the Web interface. Use the **Details** button in this page to access a complete list of the events that can be reported by your MasterSwitch Plus.

Note

Modifying events on the **Configure Event Action by Severity Level** page, will override any changes you have made to individual events on the **Details** page.

Each event is identified by its unique code, its description, and its assigned severity level. For example:

Code	Description	Severity
0x0008	System: Warmstart.	Severe
0x707	MasterSwitch: Device configuration changed on device Critical Rack	Informational

For information about severity levels and how they define the actions associated with events, see Event Actions (Web Interface Only).

Detailed Event Action Configuration page

The event codes provide a link to a page that allows you to do the following:

- Change the selected event's severity level
- Enable or disable whether the event uses the event log, SNMP traps, or e-mail notifications

System Menu

Introduction

Overview

Use the **System** menu to do the following tasks:

- Configure system identification, date and time settings, and Administrator, Device manager, and Outlet user access
- Synchronize the real-time clock for the unit with a Network Time Protocol (NTP) server
- Reset or restart the unit
- Define the URL links available in the Web interface
- Access hardware and firmware information about the unit
- Download configuration files (control console only)

Only an Administrator has access to the **System** menu.

Menu options

Unless noted, the following menu options are available in the control console and Web interface:

- User Manager
- Outlet Manager
- Identification
- Date & Time
- Tools
- Links (Web interface)
- About System

The **About System** option is a **Help** menu option in the Web interface.

Option Settings

User Manager

Use this option to define the access values shared by the control console and the Web interface, and the authentication used to access the Web interface.

Setting	Definition
Auto Logout	The number of minutes (3, by default) before a user is automatically logged off because of inactivity.
Authentication	The **Basic** setting (default) causes the Web interface to use standard HTTP 1.1 login (base64-encoded passwords); **MD5** causes the Web interface to use an MD5-based authentication login. **NOTE**: Cookies must be enabled at a browser before it can be used with MD5 authentication.
Administrator and Device Manager User	
User Name	The case-sensitive name (maximum of 10 characters) used to log on at the control console or Web interface (**apc**, by default, for **Administrator**, and **device**, by default, for **Device Manager User**).
Password	The case-sensitive password (maximum of 10 characters) always used to log on at the control console, but used to log into the Web interface only when **Basic** is selected for the **Authentication** setting (**apc** is the default for both password settings).
Authentication Phrase	The case-sensitive, 15 to 32 character phrase used to log on to the Web interface when MD5 is the **Authentication** setting. **Admin user phrase** is the default for **Administrator**, and **device user phrase** is the default for **Device Manager User**.

Outlet Manager

Use the **Outlet User Manager** option to set up user accounts that have access only to certain outlets

Web interface. Choose a user name, or choose **Add New User** to edit accounts.

Setting	Definition
User Name	The name of this user account **Note:** A user name in orange indicates that the user account has been disabled.
Password	Case-sensitive password for this user account
Authentication Phrase	Outlet user authentication phrase for use with MD5 Web authentication. This string must be 15 to 32 characters long.
User Description	Identification or description of the outlet user
Account Status	Enables, disables, or deletes this user
Outlet Access	Selects the outlets to which users have access
Delete User	Delete this user account

Control console. Select **System** from the **control console** menu. Then select **Manage Outlet Users** from the **User Manager** menu.

Setting	Definition
Add Outlet User Account Edit Outlet User Account	**User Name:** The name of this user account **Password:** Case-sensitive password for this user account **Description:** Identification or description of the outlet user **Authentication Phrase:** Outlet user authentication phrase for use with MD5 Web authentication. This string must be 15 to 32 characters long.
Delete Outlet User Account	Enter the name of the outlet user account you want to delete.

Setting	Definition
Disable Outlet User Account	Enter the name of the outlet user account to disable.
Enable Outlet User Account	Enter the name of the outlet user account to enable.
Edit Users Outlet Access	Select the outlets to which users have access: 1. Enter the outlet user name you want to modify. 2. Select the numbers of the outlets to which the outlet user will have access: • Add outlet access by entering each number and pressing ENTER after each one. Enter a blank when finished. • Remove outlet access by entering each number preceded by a minus sign (–) and pressing ENTER after each one. Enter a space when finished.
List Outlet Users Accounts	Displays outlet user name, status, description, and outlet access for each outlet user account.

Identification

Use this option to define the System **Name**, **Contact**, and **Location** values used by the SNMP agent for the unit. The option's settings provide the values used for the MIB-II **sysName**, **sysContact**, and **sysLocation** Object Identifications (OIDs).

For more information about the MIB-II OIDs, see the PowerNet® *SNMP Management Information Base (MIB) Reference Guide (.\doc\en\mibguide.pdf)* provided on the APC MasterSwitch Utility CD.

Date & Time

Use this option to set the date and time used by the MasterSwitch Plus. The option displays the current settings and allows you to change those settings manually or through a Network Time Protocol (NTP) Server.

Set Manually. Use this option in the Web interface, or **Manual** in the control console, to set **Date** and **Time** for the MasterSwitch Plus.

An **Apply Local Computer Time to Switched Rack PDU** option, which is available in the Web interface only, sets these values to match the date and time settings of the computer you are using to access the Web interface.

Synchronize with Network Time Protocol (NTP) Server. Use this option on the Web interface, or **Network Time Protocol (NTP)** on the control console, to have an NTP Server automatically update the **Date** and **Time** settings for the MasterSwitch Plus.

In the control console, use the **NTP Client** option to enable or disable the NTP Server updates. In the Web interface, use the **Set Manually** option. The updates are disabled by default.

Setting	Definition
Primary NTP Server	Identifies the IP address of the primary NTP server.
Secondary NTP Server	Identifies the IP address of the secondary NTP server when a secondary server is available.
Time Zone	Defines the offset to be used from Greenwich Mean Time (GMT) based on the time zone in which the unit is located.
Update Interval	Defines how often, in weeks, the unit will access the NTP Server for an update (1 week minimum, 52 weeks maximum). Use **Update Using NTP Now** to initiate an immediate update as well.

Tools

Use this option to restart the unit or to reset some or all of its configuration settings to their original default values.

Action	Definition
No Action (Web Interface only).	No change to the unit.
Reboot	Restarts the unit.
Reset to Defaults	Resets all configuration settings. This option will reset the TCP/IP settings and enable DHCP and BOOTP.

Action	Definition
Reset to Defaults Except TCP/IP	Resets all configuration settings except the TCP/IP settings.
Reset Only TCP/IP to Defaults	Resets the TCP/IP settings only. This option will not enable DHCP and BOOTP.
XMODEM (serial connection only)	Allows you to download firmware using a terminal-emulation program when you use a local connection to the control console. To connect to the control console locally, see Local access to the control console.

Links (Web interface)

Use this option to modify the links to APC Web pages.

Setting	Definition
User Links	
Name	Defines the link names that appear in the **Links** menu (by default, **APC's Web Site**, **Testdrive Demo**, and **Remote Monitoring**).
URL	Defines the URL addresses used by the links. By default, the following URL addresses are used: • **http://www.apc.com** (APC's Web Site) • **http://testdrive.apc.com** (Testdrive Demo) • **http://rms.apc.com** (Remote Monitoring) **Note**: Only links of type http:// can be used in these fields. For information about these pages see Links menu.
Access Links	
APC Home Page	Defines the URL address used by the APC logo at the top of all Web interface pages (by default, **http://www.apc.com**).

About System

This option identifies the following hardware information for the unit: **Model Number**, **Serial Number**, **Hardware Revision**, **Manufacture Date**, and **MAC Address**.

This screen also displays the **Name**, **Version**, **Date**, and **Time** for the Application Module and AOS.

This information is set at the factory and cannot be changed.

The control console also includes fields for system **Flash Type**, and the **Type**, **Sector**, and **CRC 16** for each module.

In the Web interface, except for **Flash Type**, this hardware information is reported by the **About System** option in the **Help** menu.

Network Menu

Introduction

Overview

Use the **Network** menu to do the following tasks:

- Define TCP/IP settings, including BOOTP server settings, when a BOOTP server is used to provide the needed TCP/IP values
- Use the Ping utility
- Define settings that affect the FTP, Telnet, Web interface, SNMP, E-mail, and DNS features of the MasterSwitch Plus.

Only an Administrator has access to the **Network** menu.

Menu options

Unless noted, the following menu options are available in the control console and Web interface:

- TCP/IP
- DNS
- Send DNS Query (Web interface only)
- Ping utility (control console)
- FTP Server, and Telnet & Web options
- SNMP
- Email

Option Settings

TCP/IP

Use this option to enable or disable BOOTP, and when BOOTP is disabled, to define the three TCP/IP settings that the MasterSwitch Plus needs to operate on the network.

- System IP address for the unit
- Subnet mask value
- IP address of the default gateway

For information about the watchdog role of the default gateway, see Resetting the network timer.

When BOOTP is enabled (the default setting), you can affect only the BOOTP setting. A BOOTP server will provide the MasterSwitch Plus with its TCP/IP settings whenever the unit is started, reset, or restarted.

See also

To use BOOTP, see the *Addendum* (.\doc\addendum.pdf) provided on the APC MasterSwitch Utility CD.

Current TCP/IP settings fields. The current values for **System IP**, **Subnet Mask**, **Default Gateway**, the **MAC Address, Host Name,** and the **Domain Name** for the MasterSwitch Plus are displayed with the TCP/IP settings in the control console and Web interface. The **Ethernet Port Speed** is displayed on the Web Interface only.

See also

For more information about how to use BOOTP, see the *Addendum* provided on the APC MasterSwitch Utility CD.

For more information on using BOOTP and DHCP, see Boot Mode.

DNS

Configure Domain Name Service Settings fields. Use these fields to define the IP addresses of the primary and secondary Domain Name Servers (DNS) used by the MasterSwitch Plus e-mail feature.

See E-mail Feature and DNS servers.

Send DNS Query (Web interface only). Use this option, available only through the **TCP/IP & DNS** menu in the Web interface, to send a DNS query that tests the setup of your DNS servers.

Use the following settings to define the parameters for the test DNS request. View the result of the test DNS request in the **Last Query Response** field (**Passed**, **Failed**, or **Not Responding**).

- Use the **Query Type** setting to select the method to use for the DNS query:
  - URL name of the server (**By Name**)
  - IP address of the server (**By IP**)
  - Mail Exchange used by the server (**By MX**)
- Use the **Query Question** text field to specify the value to be used for the selected Query Type:
  - For **Name**, specify the URL.
  - For **IP**, specify the IP address.
  - For **MX**, specify the Mail Exchange address.
- Use **DNS Server to Query** to select whether to query the **Primary DNS Server** or the **Secondary DNS Server**.

Ping utility (control console)

Select this option, available only in the control console, to check the network connection by testing whether a defined IP address responds to the Ping network utility.

By default, the IP address of the default gateway is used. However, you can use the IP address of any device known to be running on the network.

FTP Server, and Telnet & Web options

Note

The **Telnet** and **Web** options are combined in the Web interface but separate in the control console.

Each of these options has a setting which enables (by default) or disables **Access**, and a **Port** setting that identifies the TCP/IP port used for communications with the MasterSwitch Plus. The default **Port** settings are **21** (FTP), **23** (Telnet), and **80** (Web interface).

To enhance the protection provided by **User Name** and **Password** settings, change the **Port** setting to a unique port number from 5000 to 32767. After this change, when you log on, you must add a colon (:) (or a space, depending on your Telnet client) and the number of the non-default port to the IP address used. The following examples show the FTP, Telnet, and Web interface commands needed when the Port numbers have been changed to 5000 for FTP, 16512 for Telnet, and 32740 for HTTP at the MasterSwitch Plus with a System IP address of 168.612.12.114:

```
ftp 168.612.12.114:5000

telnet 168.612.12.114:16512

http://168.612.12.114:32740
```

See also

To use FTP to download configuration files, see the *Addendum* (.\doc\addendum.pdf) on the APC MasterSwitch Utility CD.

To use FTP to access a text version of the Name of second commonly-named product's event log, see How to use FTP to retrieve log files.

SNMP

An **Access** option (the **Settings** option in the control console) enables (by default) or disables SNMP. When SNMP is enabled, the **Access Control** settings allow you to control how each of the four available SNMP channels is used.

To define up to four NMSs to serve as trap receivers, see Trap receiver settings.

Setting	Definition	
Community Name	Defines the password (maximum of 15 characters) that an NMS defined by the **NMS IP** setting uses to access the channel.	
NMS IP	Limits access to the NMS or NMSs specified by the format used for the IP address. • 159.215.12.1 allows only the NMS with that IP address to have access. • 159.215.12.255 allows access for any NMS on the 159.215.12 segment. • 159.215.255.255 allows access for any NMS on the 159.215 segment. • 159.255.255.255 allows access for any NMS on the 159 segment. • 0.0.0.0 or 255.255.255.255 allows access for any NMS.	
Access Type	Selects how the NMS defined by the NMS IP setting can use the channel when that NMS uses the correct value for **Community Name**.	
	Read	The NMS can use GETs at any time, but it can never use SETs.
	Write	The NMS can use GETs at any time, and can use SETs when no one is logged on to either the control console or Web interface.
	Disabled	The NMS cannot use GETs or SETs.
	Write+	The NMS can use GETs and SETs at any time, even when someone is logged on to the control console or Web interface.

Email

Use this option to define two SMTP settings (**SMTP Server** and **From Address**) used by the e-mail feature of the MasterSwitch Plus.

For more information about these settings, see SMTP settings; for more information about the e-mail capability of the MasterSwitch Plus, see E-mail Feature.

Security

Security Features

Planning and implementing security features

As a network device that passes information across the network, the MasterSwitch Plus is subject to the same exposure as other devices on the network.

Use the information in this section to plan and implement the security features appropriate for your environment.

Port assignments

If a Telnet, FTP, or Web server uses a non-standard port, a user must specify the port when using the client interface, such as a Web browser. The non-standard port address becomes an extra "password," hiding the server to provide an additional level of security. The TCP ports for which the Telnet, FTP, and Web servers listen are initially set at the standard "well known ports" for the protocols. To hide the interfaces, use any port numbers from 5000 to 32767.

User names, passwords, community names

All user names, passwords, and community names for SNMP are transferred over the network as plain text. A user who is capable of monitoring the network traffic can determine the user names and passwords required to log on to the accounts of the control console or Web interface of the MasterSwitch Plus. This security limitation of the protocols affects any device using Telnet, a Web server, or an SNMP version 1 agent.

Summary of access methods

Interface	Security Access	Notes
Serial Control Console	Access is by user name and password.	Always enabled.
Telnet Control Console	These methods are available: • User name and password • Selectable server port • Server Enable/Disable	The user name and password are transmitted as plain text.
SNMP	These methods are available: • Community Name • NMS IP filters • Agent Enable/Disable • Four access communities with read/write/disable capability	The NMS IP filters allow access from designated IP addresses. • 159.215.12.1 allows only the NMS with that IP address to have access. • 159.215.12.255 allows access for any NMS on the 159.215.12 segment. • 159.215.255.255 allows access for any NMS on the 159.215 segment. • 159.255.255.255 allows access for any NMS on the 159 segment. • 0.0.0.0 or 255.255.255.255 allows access for any NMS.
FTP Server	These methods are available: • User name and password • Selectable server port • Server Enable/Disable	The user name and password are transmitted as plain text.
Web Server	These methods are available: • User name and password • Selectable server port • Server Enable/Disable • MD5 Authentication option	In basic HTTP authentication mode, the user name and password are transmitted base-64 encoded (with no encryption). MD5 authentication mode uses a user name and password phrase.

Authentication

Authentication versus encryption

You can select to use security features for the MasterSwitch Plus that control access by providing basic authentication through user names, passwords, and IP addresses, without using encryption. These basic security features are sufficient for most environments in which sensitive data are not being transferred.

For a security method that provides additional authentication for the Web interface, but does not provide the higher security of encryption, use Message Digest 5 (MD5) Authentication.

Firewalls

Although some methods of authentication provide a higher level of security than others, complete protection from security breaches is almost impossible to achieve. Well-configured firewalls are an essential element in an overall security scheme.

Boot Mode

Introduction

Overview

In addition to using a BOOTP server or manual settings, the MasterSwitch Plus can use a dynamic host configuration protocol (DHCP) server to provide the settings that it needs to operate on a TCP/IP network.

The method used to provide the network settings for the unit depends on **Boot mode**, a **TCP/IP** option in the **Network** menu. To use a DHCP server to provide the network assignment for the unit, **Boot mode** must be set to either **DHCP & BOOTP**, its default setting, or **DHCP only**.

See also

For more details on DHCP and DHCP options, see RFC2131 and RFC2132.

DHCP & BOOTP boot process

When **Boot mode** is set to its default **DHCP & BOOTP** setting, the following occurs when the MasterSwitch Plus is started or reset:

1. The MasterSwitch Plus makes up to five requests for its network assignment from any BOOTP server. If a valid BOOTP response is received, the unit starts the network services and sets **Boot mode** to **BOOTP Only**.
2. If the MasterSwitch Plus fails to receive a valid BOOTP response after five BOOTP requests, the unit makes up to five requests for its network assignment from any DHCP server. If a valid DHCP response is received, the unit starts the network services and sets **Boot mode** to **DHCP Only**.

   To configure the MasterSwitch Plus so that it always uses the **DHCP & BOOTP** setting for **Boot mode**, enable the **Remain in DHCP & BOOTP mode after accepting TCP/IP settings** option, which is disabled by default.

   See MasterSwitch Plus settings.

3. If the MasterSwitch Plus fails to receive a valid DHCP response after five DHCP requests, it repeats BOOTP and DHCP requests until it receives a valid network assignment. First it sends a BOOTP request every 32 seconds for 12 minutes, then it sends one DHCP request with a time-out of 64 seconds, and so forth.

   If a DHCP server responds with an invalid offer (e.g., without the APC Cookie), the MasterSwitch Plus accepts the lease from that server on the last request of the sequence and immediately releases that lease. This prevents the DHCP server from reserving the IP Address associated with its invalid offer.

   For more information on what a valid response requires, see DHCP response options.

DHCP Configuration Settings

MasterSwitch Plus settings

The **TCP/IP** option in the **Network** menu of the Web interface and control console accesses the network settings for the MasterSwitch Plus.

Three settings (**Port Speed**, **Host Name**, and **Domain Name**) are available regardless of the **TCP/IP** option's **Boot mode** selection, and three settings (**Vendor Class**, **Client ID**, and **User Class**) are available for any **Boot mode** selection except **Manual**.

When **Boot mode** is set to **DHCP & BOOTP**, two options are available:

- **After IP Assignment** in the control console (or **Remain in DHCP & BOOTP mode after accepting TCP/IP settings** in the Web interface): By default, this option switches **Boot mode** to the selection that reflects the server that provided the TCP/IP settings (**DHCP Only** or **BOOTP Only**).
- **DHCP Cookie Is** in the control console (or **Require vendor specific cookie to accept DHCP Address** in the Web interface): By default, this option requires that the DHCP responses include the APC cookie in order to be valid.

For more information about the APC cookie, see DHCP response options.

When **Boot mode** is set to **DHCP Only,** two options are available:

- **DHCP Cookie Is** in the control console (or **Require vendor specific cookie to accept DHCP Address** in the Web interface): By default, this option requires that the DHCP responses include the APC cookie in order to be valid.

  For more information about the APC cookie, see DHCP response options

- **Retry Then Stop** in the control console (or **Maximum # of Retries** in the Web interface): This option sets the number of times the MasterSwitch Plus will repeat the DHCP request if it does not receive a valid response. By default, the number of retries is 0, which sets the MasterSwitch Plus to continue repeating the DHCP request indefinitely.

DHCP response options

Each valid DHCP response contains options that provide the TCP/IP settings that the MasterSwitch Plus needs to operate on a network, and other information that affects the operation of the unit.

The unit uses the Vendor Specific Information option (option 43) in a DHCP response to determine whether the DHCP response is valid.

Vendor Specific Information (option 43). The Vendor Specific Information option contains up to two APC specific options encapsulated in a TAG/LEN/DATA format: the APC Cookie and the Boot Mode Transition.

APC Cookie. Tag 1, Len 4, Data "1APC"

Option 43 notifies the unit that a DHCP server has been configured to service APC devices. By default, the APC Cookie must be present in this DHCP response option before the unit can accept the lease.

Use the **DHCP Cookie Is** setting described in MasterSwitch Plus settings to disable the APC cookie requirement.

Following, in hexadecimal format, is an example of a Vendor Specific Information option that contains the APC cookie:

```
Option 43 = 0x01 0x04 0x31 0x41 0x50 0x43
```

Boot Mode Transition. Tag 2, Len 1, Data 1/2

This option 43 setting enables or disables the **After IP Assignment** option which, by default, causes the **Boot mode** option to use the setting that reflects the server that provided the TCP/IP settings (**DHCP Only** or **BOOTP Only**):

- For a data value of 1, the **After IP Assignment** option is disabled, and the **Boot mode** option remains in its **DHCP & BOOTP** setting after successful network assignment. Whenever the MasterSwitch Plus restarts, it will request its network assignment first from a BOOTP server, and then, if necessary, from a DHCP server.

See DHCP & BOOTP boot process.

- For a data value of 2, the **After IP Assignment** option is enabled and the **Boot mode** option switches to **DHCP Only** when the MasterSwitch Plus accepts the DHCP response. Whenever the unit restarts, it will request its network assignment (TCP/IP settings) from a DHCP server only.

For more information about the **After IP Assignment**, see MasterSwitch Plus settings.

Following, in hexadecimal format, is an example of a Vendor Specific Information option that contains the APC cookie and the disable Boot Mode Transition setting:

```
Option 43 = 0x01 0x04 0x31 0x41 0x50 0x43 0x02 0x01 0x01
```

TCP/IP options. The MasterSwitch Plus uses the following options within a valid DHCP response to define its TCP/IP settings:

- **IP Address** (from the **yiaddr** field of the DHCP response): Provides the IP address that the DHCP server is leasing to the unit.
- **Subnet Mask** (option 1): Provides the subnet mask value needed by the unit to operate on the network.
- **Default Gateway** (option 3): Provides the default gateway address needed by the unit to operate on the network.
- **Address Lease Time** (option 51): Identifies the length of time for the lease associated with the identified **IP Address**.
- **Renewal Time, T1** (option 58): Identifies how long the unit must wait after an IP address lease is assigned before it can request a renewal of that lease.
- **Rebinding Time, T2** (option 59): Identifies how long the unit must wait after an IP address lease is assigned before it can seek to rebind that lease.

Miscellaneous options. The MasterSwitch Plus uses the following options within a valid DHCP response to define NTP, DNS, hostname, and domain name settings:

- **NTP Server, Primary and Secondary** (option 42): Identifies up to two NTP servers that can be used by the unit.
- **NTP Time Offset** (option 2): Specifies the offset, in seconds, of the subnet for the unit from Coordinated Universal Time (UTC).
- **DNS Server, Primary and Secondary** (option 6): Identifies one or two DNS servers that can be used by the unit.
- **Host Name** (option 12): Identifies the hostname (maximum length of 32 characters) to be used by the unit.
- **Domain Name** (option 15): Identifies the domain name (maximum length of 64 characters) to be used by the unit.

Product Information

Warranty and Service

Limited warranty

APC warrants the MasterSwitch Plus to be free from defects in materials and workmanship for a period of two years from the date of purchase. Its obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. This warranty does not apply to equipment that has been damaged by accident, negligence, or misapplication or has been altered or modified in any way. This warranty applies only to the original purchaser.

Warranty limitations

Except as provided herein, APC makes no warranties, express or implied, including warranties of merchantability and fitness for a particular purpose. Some jurisdictions do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

Except as provided above, in no event will APC be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of this product, even if advised of the possibility of such damage.

Specifically, APC is not liable for any costs, such as lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, costs of substitutes, claims by third parties, or otherwise. This warranty gives you specific legal rights and you may also have other rights, which vary according to jurisdiction.

Obtaining service

To obtain support for problems with your MasterSwitch Plus:

1. Note the serial number and date of purchase. To find the serial number of the MasterSwitch Plus, use the **About System** menu option.
2. Contact Customer Support at a phone number located at the end of this manual. A technician will try to help you solve the problem by phone.
3. If you must return the product, the technician will give you a return material authorization (RMA) number. If the warranty expired, you will be charged for repair or replacement.
4. Pack the unit carefully. The warranty does not cover damage sustained in transit. Enclose a letter with your name, address, RMA number and

daytime phone number; a copy of the sales receipt; and a check as payment, if applicable.

5. Mark the RMA number clearly on the outside of the shipping carton.
6. Ship by insured, prepaid carrier to the address provided by the Customer Support technician.

Life-Support Policy

General policy

American Power Conversion (APC) does not recommend the use of any of its products in the following situations:

- In life-support applications where failure or malfunction of the APC product can be reasonably expected to cause failure of the life-support device or to affect significantly its safety or effectiveness.
- In direct patient care.

APC will not knowingly sell its products for use in such applications unless it receives in writing assurances satisfactory to APC that (a) the risks of injury or damage have been minimized, (b) the customer assumes all such risks, and (c) the liability of American Power Conversion is adequately protected under the circumstances.

Examples of life-support devices

The term *life-support device* includes but is not limited to neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), autotransfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators (for adults and infants), anesthesia ventilators, infusion pumps, and any other devices designated as “critical” by the U.S. FDA.

Hospital-grade wiring devices and leakage current protection may be ordered as options on many APC UPS systems. APC does not claim that units with these modifications are certified or listed as hospital-grade by APC or any other organization. Therefore these units do not meet the requirements for use in direct patient care.

Index

E

F

G

H

I

L

M

N

O

P

R

S

T

U

V

W

X

APC Worldwide Customer Support

Customer support for this or any other APC product is available at no charge in any of the following ways:

- Visit the APC Web site to find answers to frequently asked questions (FAQs), to access documents in the APC Knowledge Base, and to submit customer support requests.
  - **www.apc.com** (Corporate Headquarters)

    Connect to localized APC Web sites for specific countries, each of which provides customer support information.
  - **www.apc.com/support/**

    Global support with FAQs, knowledge base, and e-support.
- Contact an APC Customer Support center by telephone or e-mail.
  - Regional centers:

APC headquarters U.S., Canada	(1)(800)800-4272 (toll free)
Latin America	(1)(401)789-5735 (USA)
Europe, Middle East, Africa	(353)(91)702020 (Ireland)
Japan	(0) 35434-2021

  - Local, country-specific centers: go to **www.apc.com/support/contact** for contact information.

Contact the APC representative or other distributor from whom you purchased your APC product for information on how to obtain local customer support.

Copyright

990-6012C **08/2003**